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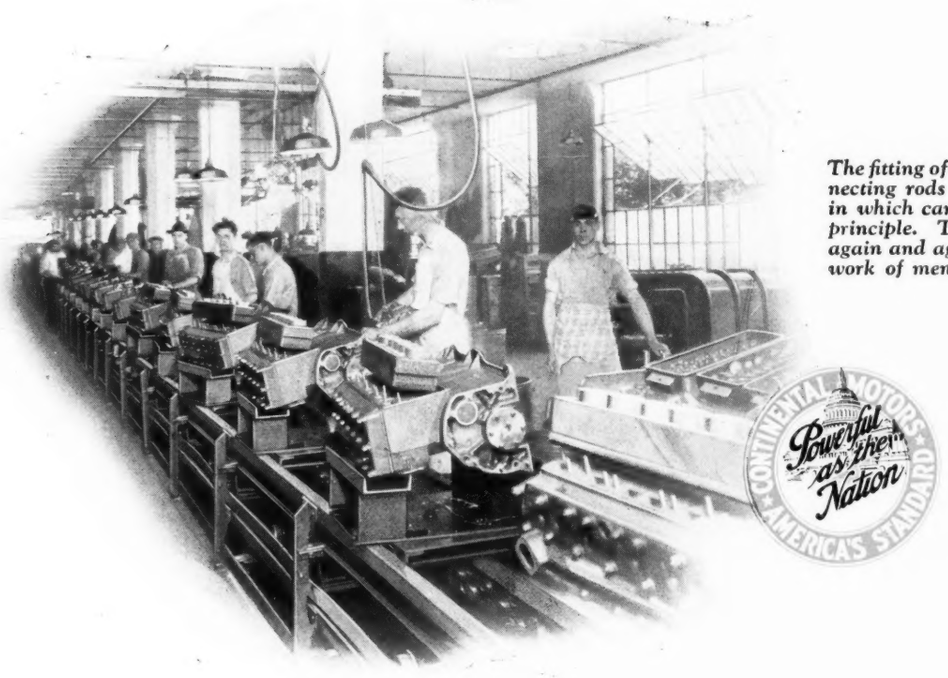

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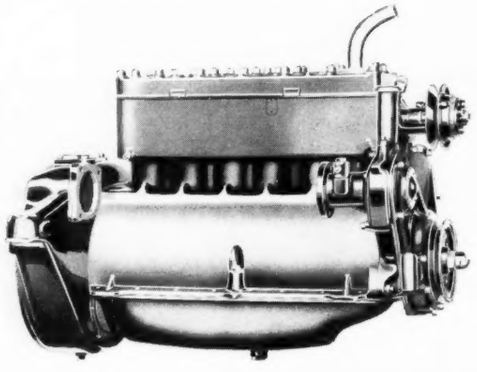

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Continental Motors

AUTOMOTIVE INDUSTRIES

VOLUME 58 *Philadelphia, Saturday, June 16, 1928* NUMBER 24

Instalment *Selling* is Stabilized *on* Firm Foundation

Retail financing difficulties of few years ago now largely corrected. Ford's entrance into field is an important development. Invasion of foreign lands continues.

By John C. Gourlie

WITH the organization of the Universal Credit Corp. for financing sales of Ford products, the Ford Motor Co. at length joins the list of companies which have arranged for national financing for the benefit of dealers and consumers, and the list now includes all the large companies and nearly all the smaller ones.

Although the Ford operation is doubtless the most important event of the year in automobile instalment selling, other developments scarcely less significant are under way and are quietly but surely broadening the service rendered by financing agencies and reducing the evils in the system that not so very long ago held the anxious attention of everyone in the industry.

The only new factor in the situation that might appear to hold the possibility of disturbance to financing is the higher money rates prevailing at the time this article is written. It is plain that current rates for instalment selling services are based on the average of low interest rates in effect for several years and that any prolonged advance would necessarily be reflected in higher financing charges.

Temporary fluctuations in the money market are readily taken care of, as a margin of safety is maintained by the companies, but several months of credit stringency would have a definitely adverse effect. The banking experts of the finance companies are, however, generally convinced that the current higher rates are the reflection of measures taken to discourage speculative excesses and that plentiful and cheap credit will soon be available again. Some observers believe that there is a genuine stringency of credit, but they agree that this is mainly due to the high level of brokers' loans, which may be corrected at any time.

In a period of higher time money the companies that have obtained a substantial portion of their funds from bond or note issues are from one point of view in better condition to handle the situation than those mainly dependent upon bank borrowing. On the other hand, the companies able to finance through security issues are usually those with the lowest finance charges, in which cost of money is a higher percentage of the cost of doing business. Costs of money are more nearly uniform than any others involved in financing charges.

The movement started by one of the big banks to extend personal credit in small amounts without collateral, which is spreading rapidly, raises the question of whether some motor car buyers may not obtain their funds this way, rather than through the deferred payment plan. The convenience of the latter, however, in view of the fact that the financing is part of the sales arrangement, and the inclusion of insur-

Engineering Issue

NEXT WEEK, under date of June 23, *Automotive Industries* will publish its Annual Engineering Issue.

Among the editorial features will be a statistical study of engineering trends; a survey of laboratory instrumentation developments, and specific discussions of gears, airplane and truck engines, higher racing engine speeds and independent springing of wheels. Contributors include Col. W. Guy Wall, S. O. White, Austin M. Wolf and other outstanding automotive engineers.

Of permanent reference value will be a series of 16 charts designed to facilitate many of the calculations frequently required in automotive engineering.

ance in the financing charge, should, it is believed cause all but a very few to prefer the regular time payment plan when they purchase automobiles.

The important changes in the financing situation, therefore, appear to be those initiated within the business and not forced upon the companies from without.

Foreign branches and connections of the national

The banking experts of the finance companies are generally convinced that plentiful and cheap credit will soon be available again

companies are being rapidly expanded, advancing the day when it will be possible to purchase almost anywhere any make of American passenger car on a basis closely comparable to the rates and terms in effect in this country. The potentialities of this movement for the export business of American producers are almost unlimited.

In the domestic field rates and terms have been well stabilized, and though financing charges are now at an extremely low level as compared with that of two or three years ago, the national companies have been able to make satisfactory earnings that have shown a tendency to increase considerably, as may be observed from the action of the stocks on the exchange.

These earnings have been rendered possible by extraordinary measures of economy in the internal organization of headquarters and branch offices, rather than through the reduction of losses. High costs of doing business have always been more of a problem to the companies operating on sound terms than have repossessions. Greater efficiency has been of immense benefit to the companies and may indirectly affect the automobile business, if present trends continue.

Some financing plans are still subsidized by the factories, and it would appear reasonable to suppose that the desirability of financial assistance to the credit companies would be reduced or eliminated by the growing efficiency of the "independent" national concerns. It is not likely that anyone would defend subsidies as a long term or permanent arrangement; it has been felt in some cases that to attain the low level of rates involved in a competitive field, and still to render the amount and character of service to dealers and consumers that was necessary, involved the necessity of subsidizing, but greater volume of business and better internal organization should tend to place all the national companies on a fairly equal basis. The sole inherent advantage of a factory-owned finance company would seem to be that the backing of the parent organization gives the subsidiary greater borrowing power than its capital and surplus might otherwise justify in the minds of bankers, but even this hurdle might be overcome where relations between finance companies and factories are as intimate as they are these days.

In the organization of the Universal Credit Corp., so far as can now be discerned, the Ford Motor Co. is proceeding along accepted lines and no radical departures from precedent have come to light. A repurchase plan with dealer reserves is understood to have been adopted. Rates, it is evident, will be lower than those prevailing hitherto for the financing of Ford sales, and will be, it is said, on a parity with the G.M.A.C. Chevrolet rates. The credit hazard in the sale of low-priced cars in the past has appeared to be somewhat greater than where the more expensive lines are involved; but this would appear to be mainly a problem concerning the proper selection of risks, at least so far as new cars are concerned.

On the other hand, an unsubsidized plan for the financing of low-priced cars necessarily must carry a proportionately higher rate, since certain of the costs of financing, such as credit investigation, accounting procedure, follow-ups, repossessions, etc., do not vary with the amount in dollars of the unpaid balance. Hence to maintain really low rates on low-priced cars without factory assistance calls for unusually efficient management on the part of a finance company.

Can Ford Reduce Costs?

Ford has been so successful in reducing costs in other respects that the plans of the new finance company will be watched with unusual interest. The immediate task of Universal Credit is the selection and training of personnel of the large number of branch offices that will eventually be established, beginning in Detroit and gradually reaching out to the important distributing centers of this country and others.

Rates and terms for all automobile retail financing are fairly well in hand, which disposes of the main sources of the controversies which once threatened the security of the business. Partly, no doubt, due to this fact, there is less criticism of instalment selling than at any previous time. In addition, bankers, economists and other influential elements have had time to become used to the idea of consumer credits, and favorable opinion has been fostered not only by the absence of any untoward consequences of instalment selling, but by the approval of such eminent students as Prof. E. R. A. Seligman.

There is some current comment based on Prof. Seligman's conclusion that the defects in instalment selling are in the manner of its application rather than the principle itself. For instance, J. H. Puelicher, writing in the *American Bankers Association Journal*, suggests that a scientific formula be developed for determining the extent to which a consumer can safely obligate himself for instalment payments, involving reserves for unforeseen contingencies and reserves to buttress the personal credit of the consumer. The plan would appear rather complex and costly to apply, and fi-

Foreign branches and connections of the national companies are being rapidly expanded

nance companies will probably prefer simpler means of protecting their operations.

Another fruitful source of controversy has almost entirely been eliminated. As the result of modifications in the recourse plan, the differences between recourse and non-recourse financing are in form rather than substance. With repossession the duty of the finance company (preceding repurchase by the dealer) and with reserves for the protection of the dealer and for his possible profit if losses are small or non-existent, little seems to remain for the dealer to worry about.

Particularly is this true since even credit investigations frequently are made by the finance company under the repurchase plans. An official of one of the largest of the national credit organizations said recently that 50 per cent of the transactions under his company's plan involved investigation on behalf of the dealer rather than by the dealer. This was described as a policy of service rather than of checking up on the dealer's operations in investigating credit risks.

Finally, soundly managed finance companies operating on the no-recourse plan insist upon dealer indorsements of doubtful deals, so that the last point of demarcation between the plans is virtually erased.

It might be assumed that with all the factory agreements now in force all financing has passed into the hands of the national companies. On the contrary, a generous number of local companies, many of them efficiently managed, continue in business. Their principal difficulty appears to be in getting enough volume, and what proportion of their financing is done in other than automotive transactions is difficult to determine.

As to the number of local companies, however, C. C. Hanch, general manager, National Association of Finance Companies, recently wrote in the *American Bankers Association Journal* as follows:

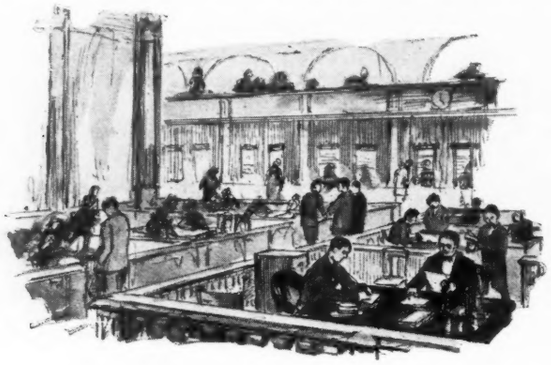
"The zenith of finance company organization was reached about the beginning of 1925. In December,

Instalment Sales in Europe

Country	Per cent instalment sales	Per cent repossessions	Kind of contract	Average per cent down payment	Average period of instalment, months
Austria	Cars, 70; trucks, 80; taxis, 90; buses, 80.	Cars, under 2; trucks, about 1; taxis, about 1; buses, about 1.	Conditional sale [1]	25 to 33	12; 18 in exceptional cases.
Belgium	Cars, 30; trucks, 60; buses, 60; taxis, 60.	Under 1	do.[1]	Cars, 25; buses, 33 1/3; taxis, 33 1/3.	12; 18 in exceptional cases.
Czechoslovakia	Cars, 60; trucks, 80; buses (few sold); taxis (used vehicles, cash only), 90.	Under 2	do	25 to 30	12; occasionally 18 to 24.
Denmark	80 to 85	½ for cars, trucks and buses; ½ to 1½ for taxis.	do	25 if for 1 year; 33 1/3 if over year.	Cars, 12 to 18; trucks, 24; buses and taxis, 24 to 36.
Finland	90	Insignificant	Hire-purchase	33 1/3	18; sometimes 24 for buses.
France	Cars, 50; [2] trucks, 75; buses and taxis, 90.	Under ½	Conditional sale	25 to 33	Cars, 12 to 18; trucks, buses, and taxis, 18.
Germany	Cars, 75; buses and taxis, 100; trucks, 100.[3]	Under 1	do	25	18; sometimes 12 or 24.
Greece	Cars, 80; trucks, 95; buses and taxis, 100.	Cars, 1; trucks, 0; buses, 3; taxis, 10.	Hire-purchase (usually); chattel mortgage.	Cars, 25 to 33; trucks, 30 to 35; buses, 15 to 5; cabs, 30.	Cars, trucks and buses, 12 to 18; cabs, 18 to 24.
Italy	Cars, 75; [4] trucks, buses and taxis, 85 to 90.	Small	Chattel mortgage	25 to 33 1/3	12.
Netherlands	Cars, 60; trucks, 80; buses, 95; taxis, 90.	½ to 1	Hire-purchase	25	Cars, 12; others, 18.
Poland	90 [5]	Less than 1	Conditional sale in Austrian and German Poland; in Congress Poland, notes only.	American cars, 40; European cars lower.	American cars, 6 to 9; European, longer.
Rumania	90	2 to 5	Hire-purchase	50	3 and 6.
Spain	New, 15; used, 5 [6]	No estimate, few	do	25	6, 9 and 12.
Sweden	Cars, 65 to 70; trucks, 70 to 75; buses, 75 to 80; taxis, 80 to 90.	4	do	New, 33 1/3; used, 40	18.
Switzerland	No estimates	No estimates	Conditional sale	25	12; some 6 to 18.
Turkey	80 to 90	Less than 1	Notes and special contract [7]	10 to 50	4 to 18.
United Kingdom	Cars, 60; trucks, 50; buses, 40; taxis, 75.	1½	Hire-purchase	25	Cars and trucks, 18; buses, 12; cabs, 24.

[1] 1 Austrian company and 1 Belgian company use hire-purchase.
[2] 50 per cent of low-price cars are sold on instalment plan; the ratio decreases as the price increases.
[3] Large customers pay cash for trucks; percentage for small customers, 100.
[4] The estimate of 75 per cent is on the basis of Fiat sales, but it is believed that it will apply to the total of all sales.
[5] Government sales are for cash; on individual sales alone the estimate is 100 per cent.
[6] Taxi, bus, and truck sales on instalment plan are greater than in the case of passenger cars.
[7] Conditional-sale and hire-purchase contracts not recognized; but a special contract, duly registered, gives the seller right to regain title in certain cases.

1924, it was reported that 1400 finance companies were engaged in automobile financing alone. It is probable that in a good many cases automobile financing was only a side line for other business. Between the beginning of 1925 and the present time a considerable number



Earnings of the finance companies have been due largely to rigid internal efficiency and economy

of automobile finance companies have retired from the field. At the present time there are approximately 850 established and known finance companies actively engaged in automobile financing. There is no census available showing the total number of finance companies. It has been estimated that the number is from 1000 to 1500, including those primarily engaged in automobile financing and those engaged in financing instalment sales of other lines of merchandise."

The national companies, by increasing their facilities in overseas markets, inevitably place themselves in a strong position to call upon the support of the factories. Two major foreign projects are now under way—those of the Commercial Investment Trust and the Commercial Credit Companies. The former is establishing branches in foreign markets after careful investigation of local conditions. Following the Porto Rico branch, others will follow in South America, Europe, South Africa and Australasia and the Far East. Several years no doubt will be consumed before the extensive program is completed.

Commercial Credit is obtaining foreign representation through its interest in Kemsley, Milbourn & Co., Ltd. This company is the outgrowth of several affiliated companies doing business in England and Australia and is now undergoing world-wide expansion. General Motors Acceptance Corp. has been well established overseas for some time.

Difficulties Overseas

Some of the enormous difficulties experienced in adapting the time payment plan to overseas operations, difficulties which have entailed long delays in the extension of the foreign interests of American credit companies, may be inferred from the table accompanying this article. The table was prepared from a recent bulletin of the Automotive Division, Bureau of Foreign and Domestic Commerce, entitled "Instalment Selling of Motor Vehicles in Europe." Varying customs and laws require different procedure almost in each country. In the Latin-American states, particularly, there is frequently little protection for the seller or finance company in a conditional sales transaction.

Two general forms of contract are commonly employed in instalment selling in Europe. In about half the countries the contract usually is of the conditional-sale type, not differing in principle, though very much in form, from that familiar in the the United States.

In a number of other countries the hire-purchase plan is more widely used. Under this plan the "buyer" contracts to rent the car for a certain period and promises to pay a certain number of instalments as rental. When the final rent payment is made the lessee has the option of buying the car for a nominal sum or possibly for no additional sum at all. Title is not automactially transferred on final payment.

The important distinction between these two types of contract is that in the conditional-sale type the purchaser is bound by contract to complete his instalments whereas in the hire-purchase plan he may free himself simply by refusing to pay further rent. This latter type is binding on the lessor but not on the lessee.

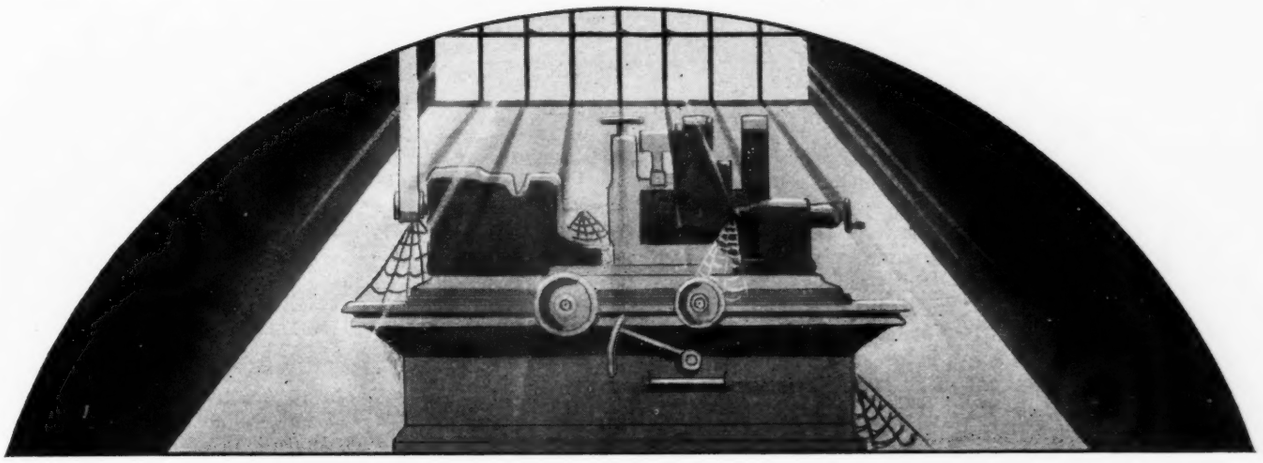
The bulletin declared that expansion of time selling has proceeded very rapidly in Europe in recent years, and estimates that last year about 61 per cent of motor vehicles sold in the United Kingdom and the Continent were sold on time. This figure may cause some surprise, as time payment sales in the United States run little higher than the percentage given for Europe.

The obstacles to foreign expansion, are, however, being overcome, and with their domestic houses well in

Even credit investigations frequently are made by the finance company under the repurchase plans

order the finance companies are in good condition to realize their opportunities in foreign markets. The large measure of stability which has already come into automobile instalment selling will, it appears likely, place the business on as secure and conservative a foundation as banking is today.

AT a recent meeting of representatives of government departments and industrial associations (including the automobile manufacturers association) in England it was decided that great economies might be effected in industry by the process of simplification or the elimination of unnecessary sizes, which cannot well be done by the Government bureau but should be undertaken by a representative body in close touch with the various industries. It was decided to set up a committee of the associations and departments represented at the meeting to act as a central organization for the promotion of the object in view. Herbert G. Williams, parliamentary secretary to the Board of Trade and secretary of the British Machine Tool Trades Association, was appointed chairman of the committee



Data on Machine Tool *Obsolescence* to be *Sought* in Survey

Matter considered of vital importance in enabling factories to take proper account of operating costs. Ordinary depreciation write-off doesn't meet situation.

By K. W. Stillman

WHILE fairly accurate information is available on the probable physical life of almost any kind of machine tool, so that ordinary depreciation rates can be set with some degree of accuracy, there is practically no information available on the subject of obsolescence. This fact is substantiated by the opinions of many production men talked to recently.

Recognizing this condition the Domestic Commerce Division of the Department of Commerce is planning to survey the obsolescence situation and to try to develop some information regarding it.

The division is convinced that the obsolescence of plant equipment should be considered as being entirely different from depreciation and that, properly to take care of the situation, a distinct method should be set up for providing against obsolescence as a hazard of business.

The division believes that no small part of the difficulties many manufacturers are now encountering, because of inefficient equipment in their plants and their financial inability to replace it with modern machinery, has been brought about by the general practice of treating depreciation and obsolescence as a single problem, in the constitution of which the latter factor has had inadequate consideration.

With the idea in mind of providing basic information to stimulate improvement of this condition, the division is preparing to conduct an investigation, under the direction of Dr. Surface, assistant director of the Bureau of Foreign and Domestic Commerce, whose purpose will be to develop factual information pertaining to the obsolescence of plant equipment, particularly that of machine tools.

This survey will be started in a narrow field to test its value, but if the test results are satisfactory it is planned to widen its scope to cover a considerable portion of the industries of the country. The information to be sought will be such, it is hoped, as may be made the basis for actuarial studies of the obsolescence hazard so that more scientific provision may be made for this business risk than has been possible heretofore.

There is no doubt that such a survey should develop information of great interest and value, and it should, moreover, perform the very important service of bringing obsolescence to the closer attention of production men.

Individual Investigations

Any particular organization, however, which desires to attack the problem should be able to obtain from its own machine tool records all the information regarding the economical life of its own machine tool equipment which the survey may be expected to develop, with the additional advantage that information obtained solely from a particular plant should be more suitable for study than that which is a compilation of data from many plants.

For the purpose of providing against obsolescence in any plant it would appear that the particular conditions prevailing there, whose influences will be shown in the machine tool records, might provide a better basis for actuarial studies than one based on broader data.

The most important and the most difficult item in the problem seems to be not the compiling of information, but the development of a method for using that

information to provide protection for the future. It is doubtful if much attention has been given to this subject and this, of course, may be the reason why so little progress has been made toward provision against obsolescence with the information on which it must be based available in the records of nearly every organization.

To some extent, at least, the obsolescence factor has been considered in setting depreciation rates, but many production men maintain that this is far from being quite satisfactory. Thus, while it is well known that a properly designed and built machine tool, when well cared for, may have a useful, physical life of 20 years or more, there are few progressive plants which do not set their depreciation rates so that the value of the tool will be written off in 10 years or less.

This method is probably better than not considering obsolescence at all, but it still is thought to be inexact. A new tool may become obsolete within a year after its purchase, because of changed design either in the tool or the product, and in such a case the fact that the value of the tool is being written off at a 10-year rate instead of at a 20-year rate is of little help.

Hits Production Executives

Nearly every production executive has had the experience of trying to sell his general management on the purchase of a new tool which, he is convinced, will produce production economies of great value, only to fail because of the fact that the tool to be replaced is still carried on the books at a high value. Even though a tool is depreciated at a rate corresponding to a much shorter life than it may reasonably be expected to have under normal conditions, this practice is still insufficient, usually, to provide for its replacement when it actually becomes obsolete. This event, unfortunately for the peace of mind of many production men, usually occurs long before the value of the original tool is written off in the company account books.

More careful consideration of the obsolescence factor appears to be advisable not only from the standpoint of providing funds to buy replacement equipment but also from the purely accounting viewpoint in showing the actual operating profits of any period.

Depreciation, as usually figured, is an operating expense which must be provided for before net earnings are established.

If, as seems fairly certain, depreciation rates in effect in many plants are insufficient to write off the value of tools before they actually become obsolete and subject to replacement, there is a nice accounting question as to whether or not all indicated profits are profits in fact.

The question arises in regard to replacing one machine by a better machine which also probably costs more than the machine replaced.

A Problem in Accounting

Depreciation reserves are usually considered to be for the purpose of keeping the plant and equipment in status quo. When a tool which has not yet outlived its physical usefulness is replaced by a modern machine which considerably improves the productive facilities of the plant, there is a question as to what part of the cost of the new tool should be charged against operating returns and what part is a legitimate increase in fixed capital investment.

Although this appears to be a technical accounting problem, the increasing value of machine tool equipment in automotive plants makes it necessary to consider carefully all phases of its control so that false data may not be made the basis for policies.

Depending upon the particular accounting methods employed, there is frequently considerable difference between book profits and actual profits, as many concerns in the past have discovered to their dismay, and in determining actual operating profits, it might be well to consider more carefully just what effect present methods, or lack of methods, in providing against obsolescence may have on them.

Magnetic "Spoiling" of Steel

A PAPER on The Effect of Silicon on Magnet Steels was presented at the recent meeting of the Iron and Steel Institute by J. Swan. The author referred to the magnetic "spoiling" of tungsten steel by annealing at temperatures between 1500 and 2200 deg. Fahr., to which attention was first called by Evershed, who drew the conclusion that the normal carbide was decomposed by such annealing and that the steel could be restored to its original state by heating to about 2300 deg. Fahr. for a few minutes. Evershed did not present any metallographic evidence indicating the nature of the carbide change. Hultgren has shown that a carbide corresponding to the formula WC is formed of certain compositions when they are annealed at suitable temperatures, that this carbide is extremely hard, and that it forms crystals of geometrical symmetry.

The author of the paper made experiments on 12 different samples of tungsten magnet steels, the tungsten content varying from 5.36 to 6.97 per cent. In the course of the experiments it was found that with one of the steels, annealing over a long period did not result in the appearance of carbide segregations in micro-photographs. The only difference between this steel and those experimented with previously was that it contained about twice as much silicon as those previously used (0.25 per cent instead of 0.13 per cent).

When the fact was discovered that a relatively small amount of silicon retarded, or, as it was at first thought, stopped the formation of tungsten carbide, it was hoped that higher percentages would possibly eliminate the "spoiling" effect produced by reheating the steel for rolling or forging. Two further steels of approximately 0.50 and 1 per cent silicon were prepared to determine the effect of silicon on carbide segregation. This did not prove to be the case, so that it is still necessary for magnet steel manufacturers to use a maximum reheating temperature for rolling of the order of 2200 deg. Fahr., if the utmost efficiency from tungsten steel is desired. It is true that 1 per cent of silicon reduces the loss of coercive force on annealing or soaking by about a half, but this is offset by the inferior all-around magnetic properties of the steel. The results of a few tests suggest that in the silicon steels the loss due to ageing is considerably less than in steels without an appreciable amount of that element. The effect of the silicon in retarding tungsten carbide segregation forms a basis for the explanation of the larger volume change on hardening tungsten die steel, which results in the progressive contraction of the bore of circular drawing dies on repeated quenching, a property so much desired by users.

THE production of synthetic resins in the United States increased from 5,944,133 lb. in 1922 to 13,452,230 lb. in 1927 and last year sufficed to meet the home demand.

Just Among Ourselves

Some Dealers Evading Tax Pledge to Public

PASSING on to the public the savings involved in repeal of the 3 per cent tax on automobile sales evidently is not proving an entirely simple matter. The manufacturers, by not raising list prices, have made it possible for the saving to reach the consumer, but dealers, there is reason to believe, are by no means universally making the indicated reduction in delivered prices. A limited survey instituted by Automotive Industries has revealed numerous instances where, in important centers, delivered prices have not been reduced since May 28, the last day when the tax was in effect. The fact that many dealers, on the other hand, have completely readjusted their schedules and through advertising and vigorous sales work have been able to cash in on the lower prices merely serves to stress the desirability of complete recognition of the tax repeal. This is one case where the manufacturer is clearly justified in bringing heavy pressure to bear upon his dealers. Factory executives find it difficult to keep a check on delivered prices, but extraordinary efforts in this direction are now urgently needed. The dealers, no less than the manufacturers, are solemnly pledged to make the public the gainer through the tax repeal, and the entire industry will suffer severely if that pledge is not honored to the letter.

* * *

N.A.C.C. Makes a Practical Move.

THE N.A.C.C. has formed a committee to study and encourage the sale and use of automobiles. That was a sound move and a practical move. As pointed out on this page last week, we are in a buyers' market and will be there for an indefinite period in the future. The only fundamental hope of getting sufficient market for all of the products which the industry now is capable of producing is to educate the user in more ways of using the automobile. That is something quite different from selling effort and sales pressure.

* * *

"How Much Can the Public Use?"

SALES pressure in itself does nothing to increase the market. As applied effectively first by one company and then by another, it simply causes the pendulum of sales to swing back and forth from one group of companies to another. The total potential market for the products of the industry really isn't increased. It is to be hoped, then, that the committee just appointed by the Chamber will stress chiefly that phase of its program which has to do with encouraging, suggesting and promoting greater use of automobiles, subordinating, perhaps, the purely selling angle. The industry needs to turn right-about-face in its approach to its fundamental distribution problem, if actual permanent progress is to be made in creating wider demand for its products. The problem is not "How much can we sell?" it is "How much can the public use?" Education of the individual adult in ways and means of using more automobiles and more automotive products probably is the basic marketing task of the industry in the next decade.

* * *

Wider Distribution Sought by Mergers

YEARS back when automotive mergers and consolidations were talked about, it was largely on the basis of economies to be effected in manufacturing and purchasing. Today, in many of the mergers which are taking place and which are under consideration, the acquirement of greater distribution facilities would seem to be the prime advantage. Two or more truck companies, each having ample manufacturing facilities to produce all the vehicles they can hope to sell, may merge, finally consolidate all production in a single plant and distribute the products of that plant through the combined dealer and distributive organization. The same sort of thing has a place in some of the consolidations in the parts and accessory field and even in the passenger car field. The search for wider and more stable distributive organizations will be the basic reason for more mergers in the future than will the desire to acquire additional manufacturing facilities.

* * *

Ground Gained Must be Held

SUCH moves in general would seem to be thoroughly sound and in tune with the economic needs of the day. What must not be lost sight of, however, is that the temporary advantage gained from a combination of sales outlets and retail organizations can be made permanent only by active, strenuous contact and further constructive building of the distribution organization as time goes on. Fundamentally the distributing problems are the same as before any combination; the basis for future effort simply has been broadened. The need for dealer education and contact has been increased rather than decreased. Marketing success doesn't become any more automatic than it was in the past. —N.G.S.

Radiator Production *is* Increased *by* Special Conveyor System

Installation of new material handling facilities has enabled Fedders Mfg. Co. to obtain greater output without adding to floor space. Conveyors mostly of gravity type.

By A. F. Denham

FACED last year with the necessity of expanding production to meet its growing business, the Fedders Mfg. Co. had the option of either entirely relocating its activities in a new plant, continuing the present plants with the building of additional units, or redesigning its layout to facilitate increased production, adding whatever was necessary in the way of additions to the main plant.

The latter solution, which was the one adopted, again presented the difficulty that the radiator manufacturing plant, with which this article deals, was located in a four-story building which normally might not be considered the ideal type for efficient straight line production, the main problem being that of economical material handling. The way in which the alterations have been worked out, however, has resulted in unusually efficient operation.

The solution of the material handling problem, as might be expected, was found in the installation of a network of conveyors which at the present time has already eliminated practically all handling of materials in process between operations. Gravity is made use of largely in transferring materials from floor to floor.

After consideration it was determined that the most advantageous type of work-carrying conveyor for the radiator core consisted in a combination belt and gravity roller, which permitted easier handling of the flat core units. Overhead conveyors, on the other hand, were installed for all handling of the shells, the latter being handled better by this type, especially in view of the chance of damage and marring of shells on belts and rollers.

The second factor to be worked out was the desire to have all operations work toward the shipping platform in the basement of the building. In a one-story plant this would have been an easy problem but in a multi-story building there is the question of where to start the operations in order to require a minimum of material handling. For instance, if everything were started on the top floor and worked down, presses for the radiator top and bottom header tanks would have to be installed on this floor and scrap metal from the blanking presses would have to be returned to the main floor.

In this case it was decided to locate the preliminary operations on the header tanks on the first floor, starting adjacent to the receiving platform. Two lines were provided, one on either side of a belt conveyor, and the equipment doubled, so

Fig. 1—Hand fixtures for crimping and lock-seaming radiator core ribbons.

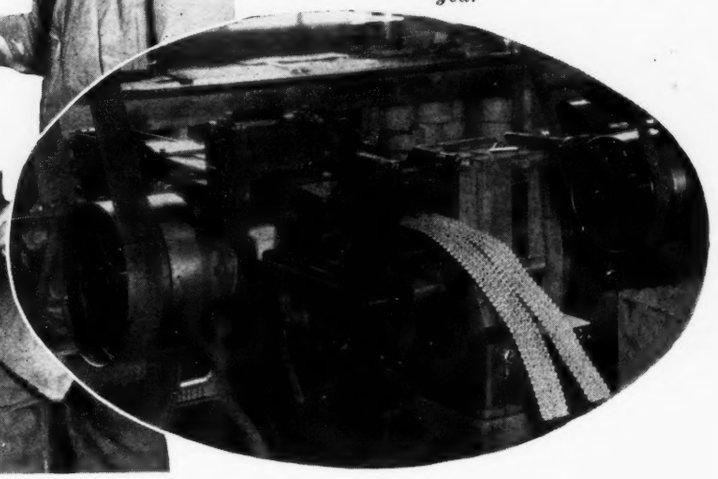


Fig. 2—Automatic machines for rolling to shape the inner, spacer, ribbons for core strips. This machine cuts them to length automatically. Note variable mounting of idler gear on back of machine to permit change in length of cut-off with the change of only one gear

that one set of presses could be operated while dies were being changed over in the other set. Of course the Fedders company manufactures a great variety of radiators and such a provision is essential in order not to tie up plant production.

In fact this same principle is applied throughout the plant. Wherever there is any danger of tying up the straight line production, equipment is duplicated, since a shutdown at any of these points would materially affect the remainder of the plant. Duplication of equipment, moreover, is of such a nature as to provide flexibility rather than a mere duplication.

Above, Fig. 4—An example of cost saving on conveyor systems. Cores are collected from two lines here to convey them to floor below on spiral rollers by gravity

Left, Fig. 3—Soldering radiator cores faces. The core in the right foreground is cooling on one side before dipping the other side

From the end of the header tank form and trim line, these parts load themselves on a continuously operating automatic elevator which takes them to the third floor of the building. Here an automatic unloading device ejects them on a gravity roller conveyor which transfers them to a belt, to take them to the remaining operations, consisting in the mounting of outlet pipes and fittings, etc.

At the end of this line there is a small storage bay to stabilize production from here on, the tanks being loaded in bins provided with castors. These are wheeled as required to the head of another conveyor line some 20 feet away, where they meet the cores for assembly operations.

Since the cores are made up entirely, except for sheet metal side walls and stud bar fittings, of ribbon brass or copper, there is no reason for starting operations on the main floor. The rolls of 0.005 in. thickness metal ribbon which come in correct core-thickness sizes are taken to the fourth floor. Here the rolls are placed on continuous roller presses, which corrugate and shape the metal to the correct form, the rollers being interchangeable for differences in ribbon design and width for varying radiators. Back of these rollers are the cut-off machines, which take the continuous strip, cut it into lengths and flatten the ends for later lock-seaming.

To expedite manufacture these cut-off machines are run so as to provide the correct relationship between full length core ribbons and the shorter lengths used at the top and bottom, the majority working on the full length strips, naturally. As a further simplification these ribbons are cut to twice required length. This is done to make the handling for lock-seaming the ends easier. This is done by means of two hand fixtures, shown in Fig. 1. The rear one of these folds and crimps the ribbon in the middle. The front one does two operations in one, first bending the free ends to overlap and then lock-seaming them. The strips are then ready for insertion of the inner spacer ribbon.

These inner ribbons are cut similarly to the main core ribbons on automatic forming rolls, provided with automatic cut-off, shown in Fig. 2. To change the length of the ribbon it is necessary to change only one gear on the machine since the idler gear in the train operating the eccentric for the cut-off is swung on a radius about the center of the driving gear.

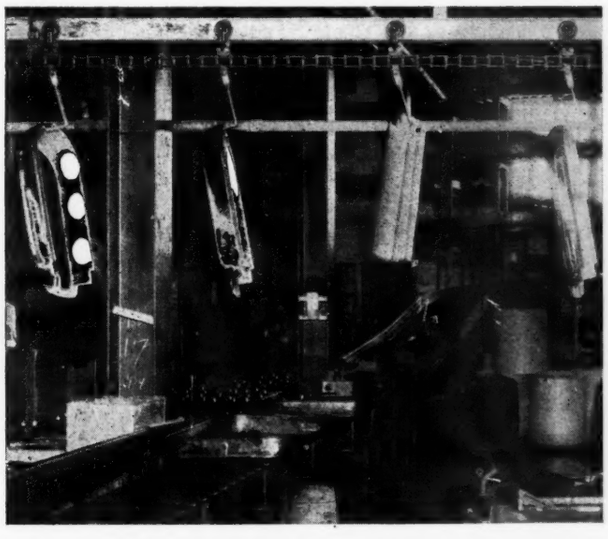


Fig. 6—Where East meets West. Cores and radiators are brought to this part of the shipping room for final assembly. Note spiral roller gravity conveyor in background

Inner ribbons are inserted in the closed end core strips by hand and the strips stacked in bins according to length to provide a storage bay. From these bins a man collects in a box the correct number to form a complete radiator, and turns this over to the operators on the metal assembly jigs, in which the strips are locked to hold them in place for the soldering operations

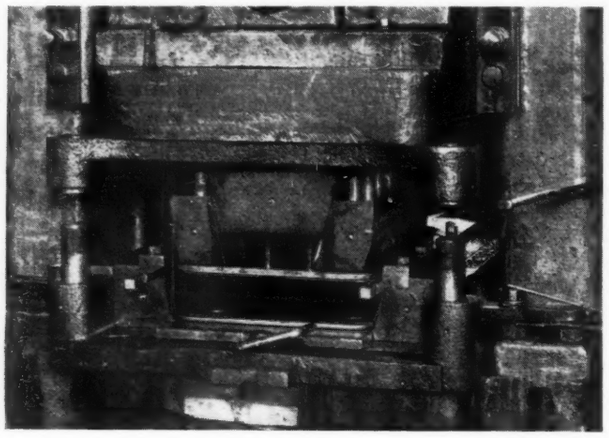


Fig. 5—This Niagara press is used for expanding the beads, etc., on the shells. Note the wedge action

for the core faces. For this operation it was requisite that the cores should return to the point of starting in order that jigs could be removed at the assembly point, ready for use on another core. To do this, two acid tanks are provided, one on either side of the dipping tank, shown in Fig. 3. One side of the core is first dipped in the acid, then lowered by a hand wheel to the correct depth in the soldering tank, and then placed to the right on the table shown for cooling. Another core is picked up from this table, dipped in the adjacent acid tank on the reverse side, soldered, and placed on the first table to cool before removing from assembly jigs.

The cores are then passed through subsequent soldering tanks for end, edge and corner dip, traveling on a continuous belt conveyor paralleling these operations. Each one of these tanks is provided with stops to prevent the core from being dipped too deep, which might result in solder filling up the entry to some of the passages.

After washing and steam-drying the cores, they are weighed, a tolerance of ½ lb. being allowed. They are then straightened by dropping them on a flat plate, which also serves as a test of the solder, any cracks occasioned naturally showing up later in the water test. From here the cores pass to the floor below on spiral roller gravity conveyors, being ejected on a belt conveyor. At this point the header tanks are brought to the core line, and these with the core are placed in jigs and spot-soldered to locate them, complete soldering being performed after removing from the jigs. This is done in order not to tie up the jigs longer than necessary, resulting in reduced investment for this type of equipment as well as reduced floor space required and easier handling of the radiators. Only one jig is necessary for each type of radiator going through the shop with this method.

The conveyor here, as in all other parts of the plant, parallels the operation lines, materials passing down one side of the floor on a belt, on a gravity roller across the end and on a belt back down the other side, with duplicate progressive operations located on each side of the conveyor. The core is next inspected and placed on one of two roller conveyors on the floor below, to which it has been brought on another spiral roller gravity conveyor. The reason for splitting the material up on two conveyors is that from this point on there are a number of minor differences in radiator design, as in the placing and mounting of stud bars, side walls, and fittings. Radiators of more closely allied design are passed through one set of operations, others passing through a different grouping, thus reducing idle time of workmen on specialized operations for one or two particular makes of cores without overloading of conveyors. It might be mentioned here that the general Fedders practice is to spot weld the radiator mounting stud-bars to the side walls before assembly on the core proper.

At the ends of the two belt conveyors, they join again in the form of a Y, as shown in Fig. 4, and the cores are taken to the floor below for water test under pressure. This test is repeated after a 24-hour storage period to permit the core to age properly to its final condition. A washing and steam-drying operation follows each pressure test.

For the next operation, that of spray painting, an overhead type of conveyor, of course, is necessary, the cores remaining on the conveyor during the enamel spray operation. Two operators take care of the maximum capacity of the plant in this operation. After painting, the cores are stored on the work floor again, partially to permit them to dry thoroughly and partly to provide a working bay from which the shipping room and final radiator assembly can draw material as required.

The final assembly operation is located in the shipping room, shown in Fig. 5. In the rear may be seen the spiral roller conveyor which delivers the finished cores, these being in individual pans to prevent marring of the paint. The shells are seen in foreground on the chain conveyor which has brought them from the plating department in another building across the street.

In the manufacture of the shells also, conveyors are used wherever possible. As mentioned, these are of the overhead chain type. As in the core plant, the press lines for shells start adjacent to the receiving platform on the first floor of a new building erected by Fedders.

These operations consist chiefly in:

1. Blanking shells on Toledo presses. Each of these is provided with quick demountable counters stamped with the name of the company for whom the run is be-

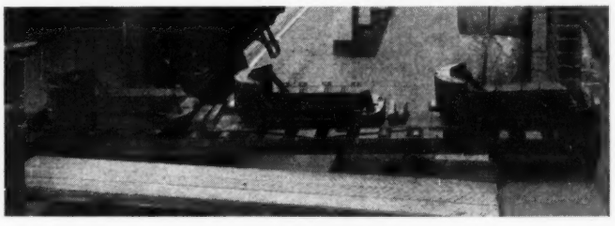


Fig. 7—Even in the loading of freight cars is manual labor avoided as much as possible. These short sections of gravity rollers are hooked on to the belt conveyor from the shipping room floor

ing made. If necessary the blanking operation also includes stamping of relief holes to take care of distortion during the

2. Drawing operation on Toledo presses. All presses are individually belt-driven from overhead motors and some are equipped with Margarette pneumatic knockouts for lifting the shell out of the dies.

(Continued on page 919)

Federal Offers New 2½ Ton Truck With Four or Six Cylinders

Patterned after Model A-6, with amidships transmission and four-wheel hydraulic brakes. Units interchangeable.

A NEW 2 to 2½-ton truck is being offered by the Federal Motor Truck Co. Designed to carry out in a larger edition the principles incorporated in the Model A-6, 1½ to 2-ton truck, announced in April, this new T series is offered in both four and six-cylinder types. In the former, the T-3, a Waukesha 4 by 5 in. engine is used, while the latter employs a Continental L-head 3⅜ by 4⅝ in. engine of 248.25 cu. in. displacement, rated at 65 hp. at 2700 r.p.m. as against 49 hp. at 2000 r.p.m. from 251 cu. in. for the four-cylinder unit.

From distributor to transmission any individual unit can be demounted without necessitating the removal of any other part. This calls for an amidships transmission and, as in the A-6, this unit is mounted in three point supports between two special frame cross-members immediately back of the cab. This design, of course, brings with it the use of two short propeller shafts, the front one incorporating two fabric universals and the rear two Cleveland metal joints.

Three-point suspension is used also for the engine, the rear supports of which are cushioned in rubber, the vertical support bolts passing through flanged rubber bushings.

Among other features are Lockheed internal hydraulic four-wheel brakes, the system including the compensating master cylinder, a gear-driven governor on the four-cylinder powerplant, air cleaner, gasoline strainer and oil filter.

Frame of Straight Type

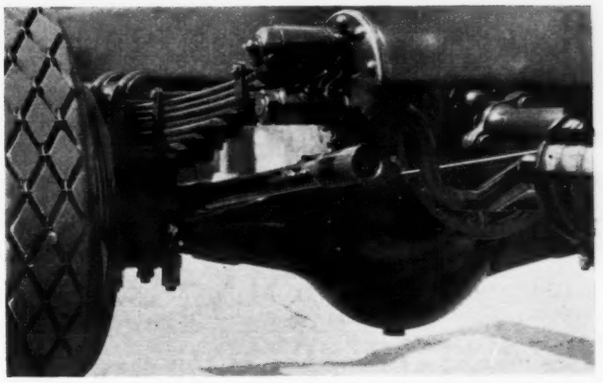
Following the Federal practice, the frame is of the straight type, facilitating the mounting of special bodies. Spring hanger brackets are riveted to the frame, the shackle pins not passing through the side members, and the stationary pin bolts being in the form of a long rod extending under the frame, connecting the two hanger brackets, thus providing a further reinforcement.

A number of tire and rear axle ratio options are available. Standard tire equipment is pneumatic all around but solids and dual pneumatics are also offered.

The six-cylinder engine has an integral crankcase and cylinder block, a seven-bearing crankshaft, 2⅜ in. in diameter, and pressure lubrication.

Electrical units are all of Delco-Remy manufacture, with Eclipse Bendix engagement from starter motor mounted in front of the flywheel housing. A Zenith central jet carburetor is standard equipment. This also applies to the four-cylinder engine which has the usual Waukesha-Ricardo type head, three-bearing crankshaft, and pressure lubrication to main and connecting rod bearings.

Other chassis units are interchangeable between the two models. The clutch is a 12-in. single plate Borg and Beck, and the transmission is of Federal manufacture. Its low speed reduction is 5.00 to 1, while second speed, which is generally always used for starting except under special conditions, has a reduction of 3.17 to 1. Reduction in third is 1.79 to 1.



View showing how spring hanger brackets are riveted to frame

Rear axles are of the Timken semi-floating, worm type. Standard gear ratio on the four-cylinder model is 7.25 to 1 with an optional ratio for high speed of 7.75 and for heavy pulls of 6.5 to 1. On the six-cylinder chassis standard ratio is 6 to 1, while optional ratios of 6½ and 7¼ to 1 are also available if desired.

Tubular radius rods parallel to the frame attach to the front hanger brackets with ball and socket joint front and rear.

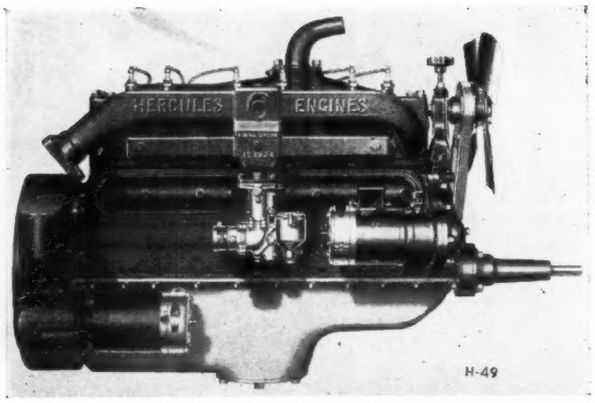
The four-wheel hydraulic brakes have 16 by 2¼ in. drums at the front and 16 by 3½ at the rear. They are supplemented by an emergency brake on the propeller shaft, mounted on the worm housing and of the expanding type, using a 13 by 3½ in. drum, ribbed for cooling.

Springs are of alloy steel, semi-elliptic all around; front, 38 in. by 2½ in. and rear, 52 by 3 in. Steering is effected through a straight ratio Ross cam and lever gear. Frames are of ¼ in. pressed steel channel section, 6 in. deep and 34 in. in total width.

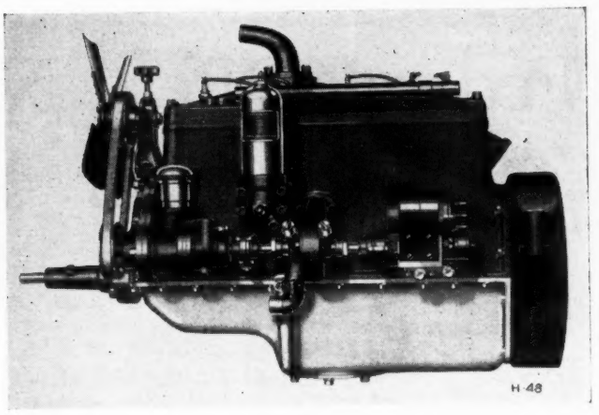
Attention has been paid to the chassis lubrication system which is of the pressure gun type. All piping where it passes through the frame is connected to pipe couplings screwed into the frame channels.

Standard wheelbase is 148 in., with a loading space of 119 in. back of the cab. Optional wheelbases of 160, 173 and 185 in. are also available as is a tractor edition with a 137 in. wheelbase. Body allowance is 900 lb.

Cabs have been designed from the point of view of driver comfort. Seat cushions are inclined, doors are fitted with remote controls and crank type window regulators and windshield wipers are furnished with the equipment. In addition, a channel type front bumper is also included.



Carburetor side of Hercules engine, showing magneto and generator mounting



Left side of engine, showing pump, magneto and oil filter

Hercules Building New Heavy-Duty Six-Cylinder Engine

Furnished in three sizes from 242 to 339 cu. in. displacement for bus and truck service. Liberal use made of alloy steels. Power output peaks at 2500 r.p.m.

AN additional line of heavy duty, six-cylinder L-head coach and truck engines is being announced by the Hercules Motor Mfg. Co., Canton, Ohio. It is known as the WX series and comprises three models, the WXA, of 3⅜ in. bore and 4½ in. stroke (242 cu. in.); the WXB, of 3¾ in. bore and 4½ in. stroke (298 cu. in.), and the WXC, of 4 in. bore and 4½ in. stroke (339 cu. in.). These engines develop their maximum torque at about 1100 r.p.m., while the peak of the horsepower curve is reached at 2500 r.p.m. The various parts of these three engines are interchangeable, except those directly affected by the bore.

The general characteristics of the Hercules YX six-cylinder model (described in *Automotive Industries* of Nov. 12, 1927) and of all four-cylinder models are incorporated in this series. Rigidity is obtained without excessive weight by using alloy steels wherever expedient. The number of screw and nut sizes has been kept down to a minimum. A ½-in. wrench will remove the oil pan, gear cover, bell-housing, cylinder head, manifold, valves cover, water pump, oil filtrator, magneto bracket, oil strainer and fan assembly.

2⅝ In. Crankshaft

The crankshaft is 2⅝ in. in diameter at the seven main bearings. Bearing areas vary, the front bearing being 1⅝ in. long; the center, 2⅝ in.; the rear, 2¾ in., and the intermediate, 1⅜ in. each. Connecting rod bearings are 2¼ in. in diameter and 1½ in. long. The upper half of the main bearings is a bronze-backed babbitt bushing, while the lower half consists of babbitt cast into the drop-forged steel cap. Babbitt is also cast directly into the heads of the steel connecting rods, which have a center-to-center length of 9⅝ in.

The camshaft is supported by four bearings, each 2⅛ in. in diameter. Front and rear bearings are 1 9/32 in. long, while the intermediate bearing is 15/16 in. long.

Pistons are of cast iron. In the smallest size there are three rings, all above the piston-pin, and in the two larger sizes there is an additional ring below the pin. Rings are all 3/16 in. wide, and in the third groove an oil regulator type is used. Piston-pins are of molybdenum steel, 1⅛ in. in diameter and are locked in the rod by a clamp bolt

Centrifugal Type Water Pump

The centrifugal-type water-pump is bolted directly to the crankcase, and registers with the cylinder block water passage, thereby eliminating a hose connection. This pump delivers 64 gal. of water per minute at 2000 r.p.m. The water flows from the pump to the valve side of the cylinder block, where it is distributed to the cylinders, around the valves, and to the valve stem guides, which latter have been brought very close to the valve heads to promote radiation of heat from the head. Intake and exhaust valves differ with respect to size. The intake valves have a clear diameter of 1⅝ in., exhaust valves of 1½ in. Valves are operated by mushroom tappets of molybdenum steel. Exhaust valves of Silchrome steel.

All accessories are conveniently mounted. The accessory shaft on the left side is supported by a bearing 1 15/16 in. in diameter and of sufficient length to maintain alignment. This shaft operates the fan, distributor take-off, water pump and magneto. Ignition may be by battery and distributor, by magneto, or by both, as desired. On the right side is the generator; it has the standard sleeve-type mounting and is driven by a gear. A base-type mounting can be supplied for the large generators required by coaches. Here provision is made for mounting a 6 in. starter. A No. 2 S.A.E. flange mounting is used in connection with an 11-tooth

pinion and a 126-tooth flywheel ring shrunk on.

The one-piece combination intake and exhaust manifold is of the Swan type. The intake manifold and branches are completely surrounded by a heat jacket. An oil pump located under the center main bearing and slightly inclined to reach the center of the sump, provides force-feed lubrication to all main bearings. The crankshaft is drilled to carry oil to the connecting rod bearings. The pump is always below the oil level and is entirely surrounded by a large screen over which is a shield acting as a vacuum drum in case the oil screen becomes clogged. A built-in filtrator cleans the oil on its return to the main header.

Either the No. 2 or No. 3 S.A.E. flywheel housing is provided.

Republic Three-Ton Truck

A SIX-CYLINDER, four-wheel brake, 3-ton model is the latest addition to the line of the Republic Motor Truck Co., Inc., Alma, Mich. This new unit is designated according to its wheelbase; the 179¼-in. wheelbase chassis is known as Model 65 and the 200¼-in. job as Model 66.

The powerplant is a six-cylinder, 3⅞ x 5 in. Lycoming Model TS having an S.A.E. brake horsepower rating of 75 at 2400 r.p.m. This engine is of the single block, L-head, detachable-head type suspended from three points. A gear-type oil pump furnishes full-pressure feed through drilled crankshaft to main and connecting rod bearings. Starting, lighting and ignition are by Auto-Lite equipment, battery and coil being used for ignition. The fuel line includes a 30-gal. tank mounted under the seat, vacuum tank, gascolator and Zenith carburetor.

Water is circulated by a centrifugal pump and the radiator is of the Republic armored detachable type with cast tank and sides and cellular core.

Mounted in unit with the engine are a multiple disk clutch and four-speed transmission, both of which are of Fuller make. Drive to the rear axle is taken through a two-piece tubular propeller shaft equipped with three metal, oil-tight universal joints. The rear is a double reduction Eaton with herringbone gears in the final reduction and provides a ratio of 7.5 to 1.

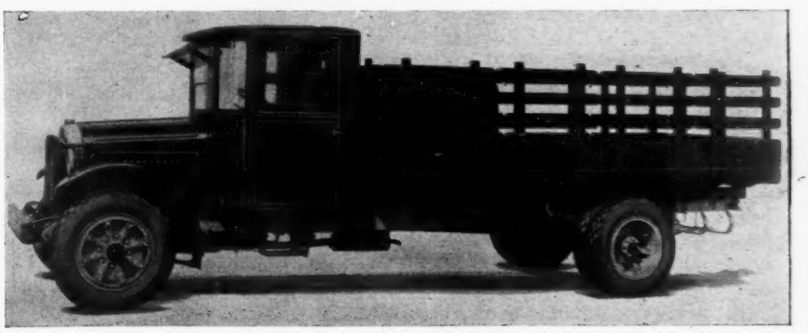
Service braking is through four-wheel mechanically operated brakes, the front wheel brakes of which are of the Bendix three-shoe, self-energizing internal type and the rear of the two-shoe internal type. The emergency brake is mounted on the front propeller shaft at center bearing support and consists of a 10-in. drum and two shoes.

Semi-elliptic chrome vanadium steel springs support the frame which is of pressed steel, 7 1/16 in. section, 2½ in. flange and 9/32 in. stock. The front springs are 39 x 2½ in. and the rear, 56 x 3 in.

One of the new features of this model is the low frame height of 30 in. which is accomplished by a special design of the spring brackets which permits the use of over-slung springs. The front bracket of the rear spring is designed to bring the front spring bolt on a level with the top of the frame. The rear bracket is riveted to the frame at two points. Between these points the body of the bracket extends outside the frame and parallel with it and the shackle is attached to the bracket by a bolt extending through it. The shackle extends upward from both sides of the bracket and carries the rear shackle bolt at a point midway between the top and bottom flanges of the frame.

Hannum screw and lever type steering gear is used. The wheels are Van metal spoke type equipped with 34 x 7 in. pneumatics in the front and 34 x 7 dual pneumatics in the rear.

Standard equipment includes generator, lights, ammeter, horn, speedometer, air cleaner, radiator guard and bumper, oil pressure gage, spare rim and tire carrier, etc. Flexible metal hose is used between the exhaust manifold and the muffler which is mounted midway in the chassis.



Republic Model 65 six-cylinder truck. Note spring bracket design which permits use of over-slung spring

Books for the Business Bookshelf

New Metal Statistics

Metal Statistics—1928. American Metal Market, New York. $2.

THIS, the 21st edition of this handbook, carries out the plan used so successfully in other editions so that the amount of information presented is as complete as one could desire. Producer and consumers, buyers and sellers of metals and iron and steel products should find this book very valuable in their work.

Financial and Business Forecasting

Warren F. Hickernell. Alexander Hamilton Institute, New York. 2 vol., 426 and 488 pp.

THE four essentials of business forecasting, as the author sees them, are business statistics, knowledge of economic principles, perspective based on a study of business history and good judgment in interpreting information. The present book appears to be mostly devoted to the third essential, that of providing a perspective based on a study of business conditions. The supply of loanable funds is the most important factor in business cycles, according to Mr. Hickernell, so that a good share of his book is devoted to discussions of the causes and effects of variations in this supply.

The first volume is devoted mainly to a financial history of the world, with particular reference to the United States, during the nineteenth century. The second volume takes up financial events within recent years and, in addition, contains much information regarding movements of stock and commodity prices.

THE FORUM

Excess *Production Capacity* Blamed for Price Selling

Comments on Norman G. Shidle's recent article on factory buying practices throw additional light on this timely subject. Various views expressed.

Editor, AUTOMOTIVE INDUSTRIES:

Mr. Shidle in his article in *Automotive Industries* concerning buying practices in the industry has covered this subject so well that there is very little new to be added.

In regard to machine tools and equipment, so far as our own policies are concerned, the price factor is a secondary consideration. It does, of course, have an influence on the final decision. But the equipment that seems best adapted has the first choice, and is analyzed from a production utility standpoint. Competitive equipment is also studied from the same angles. Prices are then obtained from various likely sources of supply, but if the price of the preferred equipment is reasonable, it would most likely be selected, even though the highest on the list.

My impression is that, with the larger manufacturers, this course is quite generally followed. The reason is that new equipment is bought only occasionally, and lasts a long time. One might as well have the best, even where the price is the highest, so long as that price is not too much out of line.

A Different Psychology

There is an entirely different psychology back of buying production or consumable materials. These are often bought in very large quantities over a year's period; a little difference in price is multiplied out many times during the year. It seems entirely logical that the buyer should make his selection in the lowest market.

The main difficulty seems to be with the seller of such goods, rather than the buyer. There is, undoubtedly, an over-capacity for production in most lines of goods at the present time. The producer figures that if he can obtain sufficient business to fill his plant, he will, thereby, reduce his overhead and hence put himself in a much better selling position. He is apt to take some business at no profit in order to help carry his overhead, expecting to make his profit on other lines. This, of course, tends to reduce selling prices all around, and often makes it difficult for anyone to make a fair profit.

In this situation we are dealing with a condition, and not with a theory. As long as over-capacity exists we are going to have prices cut in an endeavor to fill factory space. It is simply an economic law of supply and demand.

The buyer of elementary products becomes, in his turn, the seller of more finished products, and he has to face the same competitive situation. It can hardly be expected otherwise but that he will buy at the lowest possible price, quality considered. A few concerns may go contrary to this, but certainly most manufacturers who are faced with competitive conditions will have to buy their materials at the best price obtainable. Just as long as sellers keep cutting prices, so long will the lowest bidder get the big share of the business, or compel competitors to make concession.

The reason for this over-capacity in manufacturing equipment is a long story, but it can be definitely traced out. The conditions referred to above will be remedied only when present excess capacities are used up, or when a certain number of competitive factories go out of business. Temporarily, they may agree to curtail working hours.

In some lines of manufacture, associations are being formed in order to maintain or raise prices. But there is always the difficulty of independents underbidding the association price. The manufacturers of one large product agreed to curtail production hours per week in order to cut down on capacity. From their viewpoint it seemed necessary to do something in order to save the industry from ruin.

After all, the problem is one of production capacity in its relation to demand.

E. K. WENNERLUND, *Director,*
Works Managers Committee,
Factory-Production Engineering Section,
General Motors Corp.

A Cause of Dissatisfaction

Editor, AUTOMOTIVE INDUSTRIES:

Norman G. Shidle's article in the May 26 issue on the subject of buying practices in the automotive industry, arrives in the same mail with a bit of news that illustrates precisely an unfortunate condition in the buying department of many automotive companies. I

refer to an unfortunate lack of loyalty to a tried and trustworthy vender on the part of a buyer who switches his orders to the lowest price cutter without notice to his regular source of supply.

Of course, being in the spring business, my illustration is appropriately one concerning springs.

A certain leaf spring manufacturer had been selling a large truck manufacturer all his chassis springs. For several years this spring maker had furnished excellent springs, given prompt and dependable service and received a fair price for his product. Shortly after the war, Mr. Truck Manufacturer encountered financial difficulties and could not pay his bills promptly. Now, Mr. Spring Maker helped the truck maker in every way he could; continued to furnish high quality springs, voluntarily reduced his price with the declining market price, and carried Mr. Truck Maker's notes for over a year. Naturally, Mr. Truck Maker avowed his gratitude and said that as long as Mr. Spring Maker continued to make good springs at fair prices, with good service, he would get all the truck maker's business. So far in the story everything is lovely.

Enter the Price Cutter

Then enters the price cutter. "Please Mr. Truck Maker, give me some of your spring orders."

"Oh, no, I'm buying from Mr. Spring Maker who has supplied me with good springs for years and who helped me out when money was scarce, and besides *your price is no better, is it?*"

Mr. Price Cutter saw that the loyalty talked about wasn't real enough to stand a price inducement, so he promptly offered a low price. He gave a cheaper alloy steel and claimed that "alloy steel was alloy steel"—"all the same physical properties, etc." and got away with it.

So Mr. Spring Maker is out of luck. Mr. Price Cutter has the business but no profit. Mr. Truck Maker has spring trouble on the way, and all *three* concerns are dissatisfied.

O Tempora! O Mores! How long, O Lord! How long? When will purchasers learn that buying cheap goods to save money is like stopping a watch to save time?

H. T. MOORE,
Tuthill Spring Co.

Buying From One Source

Editor, AUTOMOTIVE INDUSTRIES:

Your article in the May 26 issue on buying practices opens a subject pertinent to all angles of any business. Profit is of course essential at any price, in order to maintain the same or better prices on future orders. We all know that low price goes hand in hand with high production, providing the manufacturing facilities are adequate and the management sound.

In view of this well proved and established fact, it is hard to account for the policy laid down by some purchasing agents, probably in many instances by the general manager himself, that there must always be at least two sources of supply. Possibly this may be due to lack of knowledge on the part of the purchasing agent or general manager, as to the facilities of their prospective suppliers. If so, price is about the only argument that talks when considering an article bought against specifications, but the reaction from this policy tends to maintain price, rather than make it possible for any supplier to quote the minimum.

One answer to this problem necessitates knowledge on the buyer's part that the supplier is sound and dependable, and amply able to deliver the required parts in quantity and quality. On which basis there should be no hesitation in placing the entire order with one concern. It is hard to conceive that the risk in placing business in this manner is greater than decisions which are made daily to make all of certain parts in the buyer's own plant. In either case, fire or other uncontrollable circumstances would cause the same amount of difficulty and could be surmounted in the same manner.

Another general policy which might well be given the distinction of a new business principle and could well be adopted by the industry as a whole is defined by C. E. Wilson's recent paper on the general policy of the Delco-Remy Corp. This policy of placing firm orders only for quantities required for short periods and working against a general agreement between the buyer and seller, whereby all the buyer's requirements will be purchased for a certain period from one source, would eliminate a great deal of the gambling now connected with business. This gambling, we must admit, sometimes results in a temporary low price in order to unload dead inventory, but the resulting loss must necessarily be paid in the long run, possibly on some other article going to the same buyer, and tends to delay the eventual minimum price.

Summing up, the present situation seems to call for more cooperation and absolute frankness between buyer and seller. The concerns who will start this policy and carry it through with all suppliers is going to find that they have increased their profits, reduced their prices, and have a line of suppliers who will help them over their difficulties rather than hold them up for higher prices at every opportune moment.

C. H. ALVORD,
Factory Superintendent,
Dubilier Condenser Corp.

Air Transport Viewpoint

Editor, AUTOMOTIVE INDUSTRIES:

Referring to the article by Norman G. Shidle in your issue of May 26.

Air transportation is still a new field and most of our buying has to do with special articles that are made to order. In this sort of buying we generally have samples submitted by different manufacturers and then give our order to the company that produces what we want at the best price. Our first consideration is getting what we want and the price is considered afterwards. An article that does not do what we want it to do, of course, costs us many times its purchase price in service required, so that we can not consider price except as a secondary proposition.

There are, of course, some standard machine tools that we use where price can be considered, but even in this field, we have first to consider the service that we can get out of the article. There has been very little done as yet toward using labor saving devices in air transport because the business is so new, and we are faced with the problem of having these devices made to fit our particular needs. Sometimes we even have to go to the extremes of manufacturing in our own shops the article that we need, because we can not find a manufacturer who will build what we want, and it is for this reason that we find it necessary to employ many highly skilled mechanics and to have shop equipment for the production of these parts.

WESLEY L. SMITH,
National Air Transport, Inc.

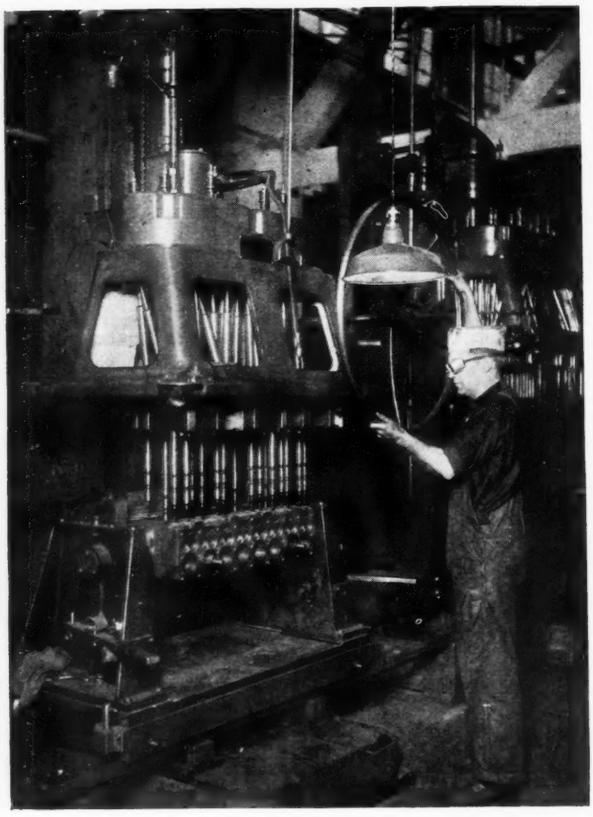
Production *of* Lycoming Cylinder Blocks—*Part 2*

After water-testing, blocks are mounted in trunnion fixtures with rollers and moved on twin rail tracks connecting machines used in the next nine operations.

By K. W. Stillman

IN the first part of this story on the production of cylinder blocks at the plant of the Lycoming Mfg. Co., which appeared in last week's issue, the block was left at the water test. It had passed through several milling operations, the barrels had been rough and finish bored and semi-finish reamed, the valve throats, valve seats and valve stem guide holes had been finished and the block water-tested.

After water-testing the blocks are mounted in trunnion fixtures equipped with rollers and remain in them during the next nine operations. The various machines used in these operations are connected by twin rail tracks along which the block in the fixture is easily moved from one operation to the next. At the end of this series the blocks are unloaded and the fixtures are carried by a return track back to the starting point to be used again. Because no time is wasted in rejigging for each operation or in moving pieces from one machine to the next, only three men are required to carry on these nine operations at the 10 per hour rate.



One of the many Bausch multi-spindle drills used in drilling the numerous holes in the cylinder block. Note the trunnion type fixture which runs on twin rail tracks and permits a number of operations to be performed without rejigging

The first operation of this series is performed in a Bausch 28-spindle drill in which the cylinder head stud holes are drilled and the timer shaft hole is drilled part way through. For this operation and for nearly all the others in the series, a bushing plate riding on the machine head is employed.

In another Bausch, a 13-spindle machine this time, water holes are drilled in the top of the block. Cylinder head stud holes are then counterbored in a Carlton radial drill. Still another Bausch 32-spindle machine is used to drill all holes in the manifold side of the block, the oil relief holes being drilled only to the depth of the machine head travel.

The oil relief pad is finish drilled, counterdrilled and spot faced and the oil pump bearing set screw holes are counter drilled and spot faced in another Carlton radial, after which 29 holes are tapped in the manifold side by a Bausch 29-spindle tapper.

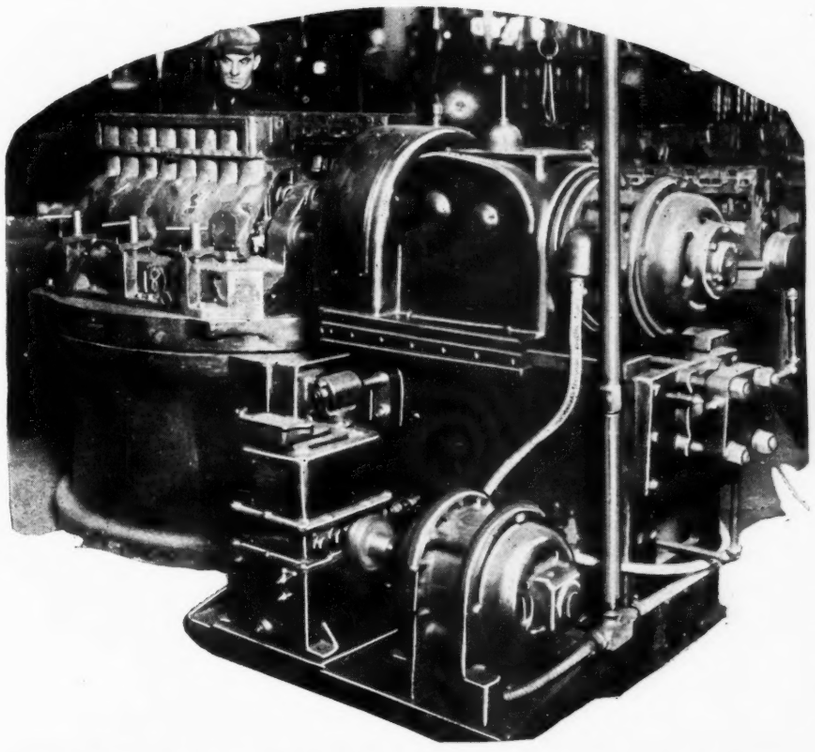
A 41-spindle Bausch is employed to drill all holes in the water back side of the block. Of these, 39 are tapped in the next operation in another Bausch tapper. The final operation of this series performed by three men is to tap the cylinder stud holes, which is done in a Bausch 29-spindle multiple tap.

The block is removed from its fixture, which is returned to operation No. 13, and the timer shaft holes are finish drilled in a Leland-Gifford machine, no fixture being used.

Following this, the block is mounted in another trunnion type fixture fitted with rollers, in which it remains during the next two operations. In the first the front end is drilled and tapped by means of a Bausch 32-spindle multiple and in the second the same type of machine is employed to drill, ream and tap the rear end.

In both of these machines there are two working positions utilized, while a bushing plate riding the machine head is provided. Two men are required to carry on these last three operations.

The oil gage and breather pipe hole are drilled in a Cincinnati-Bickford radial drill fitted with an angle



Rockford three-spindle, Oil Gear horizontal boring mills are employed for finishing cam and crank holes. The 180-deg. indexing table carries two work-holding fixtures

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Each of the foregoing two operations require the full time of one man.

The barrel bores are beveled next in a 15-in. single spindle Baker drill, after which the oil pan flange, bearing cap stud, oil line, left front support and oil pump shaft holes are drilled, the last only to the depth of the head travel. A Bausch 37-spindle multiple is employed.

The bearing cap stud holes are counterbored in a Carlton radial, the bearing cap dowel and oil return holes are drilled in another Bausch multiple and the oil pan flange, bearing cap stud and two oil line holes are tapped in still another 31-spindle Bausch.

The preceding five operations are performed by two men, no fixtures being used for any of them but all the drilling operations being done through a bushing plate. An inspection follows.

Two men are needed to assemble studs and bearing caps at a bench immediately adjacent the conveyor carrying the blocks between the machine tools.

The next operation, the 33rd, is to rough bore the cam and crank bearings. A Rockford 3-spindle, Oil Gear, horizontal boring mill is used, equipped with a 180 deg. indexing table and two work-holding fixtures, so that all loading and unloading is done during machining time. Directly following the rough bore is the semi-finish bore, using identical machine and equipment, and then comes the finish bore in a third identical setup.

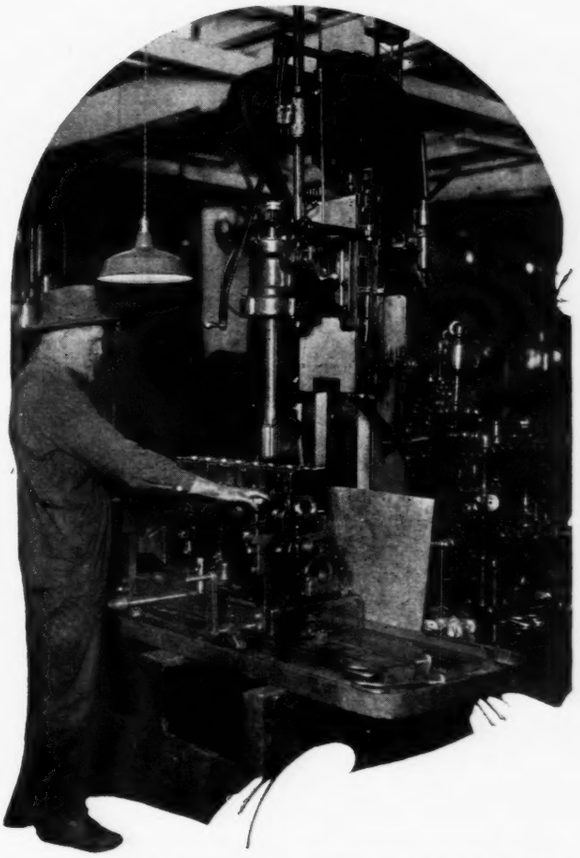
The crank bearings are finish faced in a single spindle Rockford horizontal equipped with Oil Gear drive. This machine is fitted with a 180 deg. indexing table but only one fixture is needed, so the table is not indexed. One man is employed on each of the four preceding operations.

The oil pump hole is finish drilled, bored and reamed next in a 32-in. Aurora column type single-spindle drill which is fitted with a box type fixture with slip bushings. One man runs this machine and while the drill is operating he finds time to disassemble the bearing caps.

Another Carlton radial drill is used to ream and tap the oil relief hole, tap bearing caps for the oil line and drill angular oil holes to the cam bearings. An open fixture is employed in which the block is located through the barrels with an angle plate fixture also provided for drilling the angular holes. The operator reassembles the bearing caps while the drill is working.

The next operation is to drill, ream and countersink the bearing cap dowel pin holes. This is done in a Leland-Gifford single-spindle drill equipped with a box type fixture and slip bushings. One man is needed for each of the two preceding operations and they cooperate to turn out 10 pieces per hour.

(*Continued on page 917*)



The cylinder bores are lapped in Moline, semi-automatic, Oil Gear, single-spindle laps. The base-plate type fixture has plunger pins for locating

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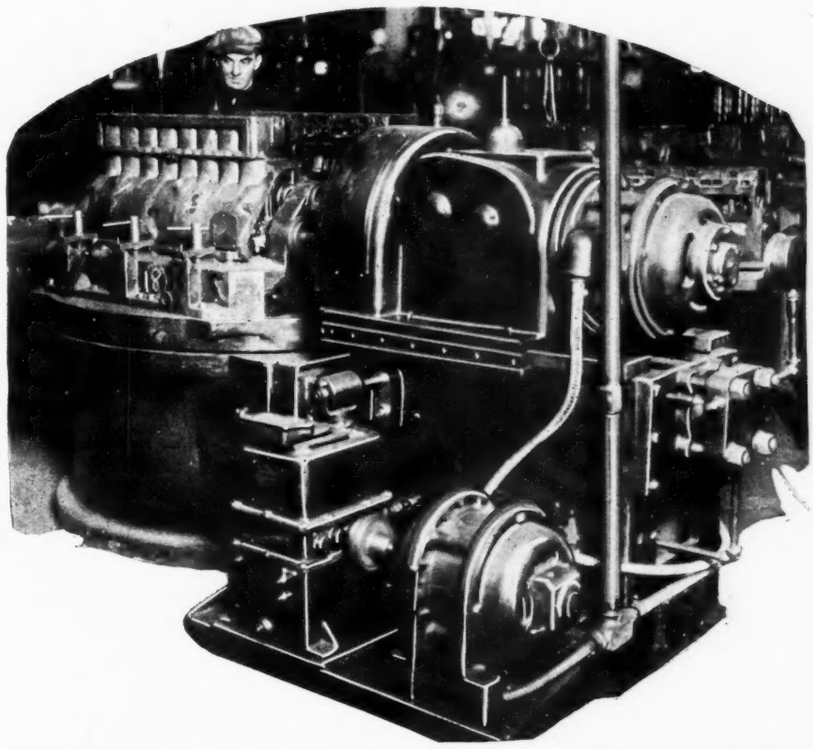

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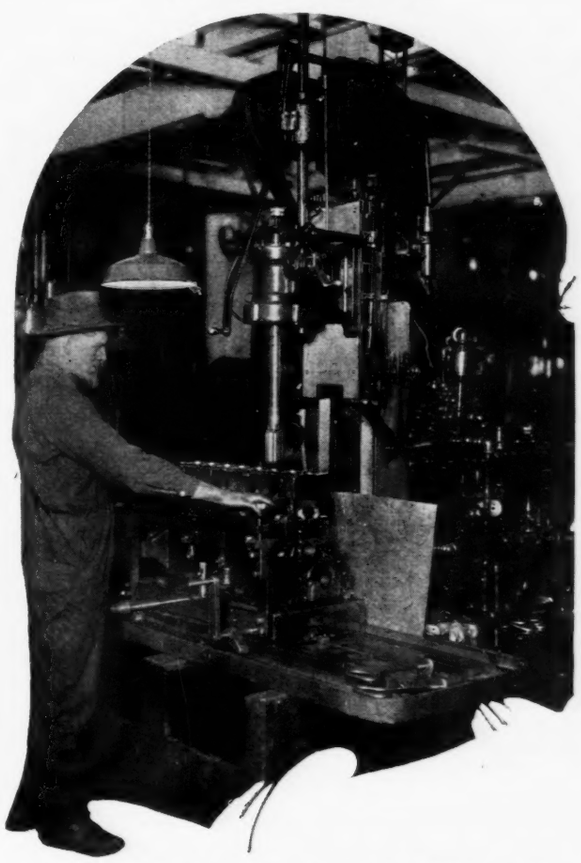

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THIS contribution by Mr. Samuels may appear to be one of pure mathematics of no direct application in automotive engineering. However, graphical differentiation, which involves the determination of tangents to the curve representing the equation to be differentiated, is very convenient in connection with several problems that arise in automotive work.

The construction of speed and acceleration curves from a displacement-time curve is one instance, and another problem to which the method might be applied with advantage and which is particularly timely just now is the construction of instantaneous speed and acceleration curves for the individual piston of a radial engine with articulated connecting rods.—*Editor.*

Simple Method *of Drawing* Tangents *on* Irregular Curves

Inaccuracies of graphical differentiation are overcome by system involving use of transparent paper.

By William Samuels

IN studying the motion of bodies we find the speed by differentiating the travel with respect to time and the acceleration by differentiating the speed with respect to time. This rule should be followed wherever its application is possible and practical.

However, there are frequent cases where the above analytical method cannot be employed. The motion may be caused by a cam and follower, possessing irregular outlines, or a motion of mathematical regularity may be so complex as to defy an analytical solution.

In all such cases we resort to a graphical solution. Plotting travel against time and drawing tangential lines on the plotted curve, we find the speed from the slant of the tangential lines. Plotting speed against time and drawing tangents, we find the acceleration from the slant of the tangents; or plotting speed against travel and drawing normals to the plotted curve, we find the accelerations from the length of the subnormals.

These graphical methods are simple enough. Unfortunately, however, as used in the conventional manner, they are not very accurate. Plotting a travel or lift curve offers no difficulties. It can be done with any degree of exactness desired, depending upon the scale chosen. But in drawing tangential lines on such a curve, considerable space is left for the judgment and eyesight of the calculator.

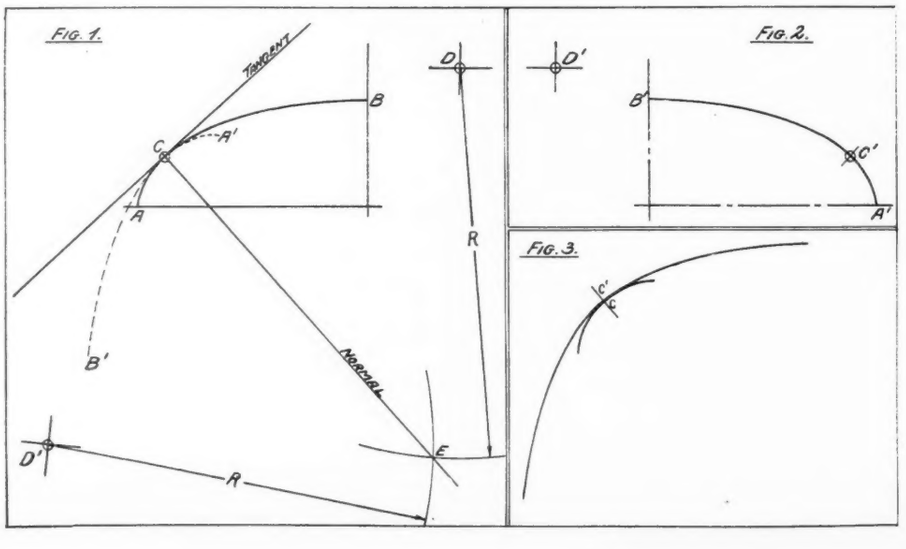
The following method for constructing normals and tangents on irregular curves may help to overcome that weakness in graphical differentiation.

In Fig. 1, *A-B* may be considered an irregular curve. In reality it is a quadrant of an ellipse, chosen for our purpose to permit a check of the exactness of the method from the known properties of an ellipse. We draw the irregular line *A-B* on transparent paper, mark the point *C* on which we wish to construct the tangent and mark an arbitrary point *D* on the paper.

Next we trace the curve *A-B* and the two marked points *C* and *D* on a second piece of transparent paper. Turning this second paper over, we have, as in Fig. 2, a mirror picture *A'-B'* of the first surve *A-B*. The points *C'* and *D'* correspond to the points *C* and *D*.

Now we slide the second paper under the first paper, until point *C'* coincides with point *C* and turn the second paper around *C'* until, as shown in Fig. 1, branch *B-C* forms a continuous curve with branch *B'-C* and branch *A-C* forms a continuous curve with branch *A'-C*.

Next we strike arcs of the arbitrary radius *R* around *D* and *D'*, the arcs intersecting in *E*. *C-E* is the normal



to the irregular curve *A-B* in the point *C*. The tangent in *C* stands vertical to *C-E*.

Before deciding at which position of the two papers the branches *B-C*, *B'-C* and *A-C*, *A'-C* form continuous curves, it is well to move the two papers slightly apart, approximately in the direction *CE*, as shown in Fig. 3. If placed correctly, the two curves near the points *C* and *C'*, respectively, must be parallel. The human eye, fortunately, is very sensitive regarding lack of parallelism and will detect all but the most minute errors.

As stated before, *A-B* in our example is an elliptical quadrant. The curvature of the elliptical line near *C* changes rapidly and *C* was purposely positioned in this neighborhood. Notwithstanding this disadvantageous circumstance, a check proved that *C-E* coincided almost to perfection with the geometrical normal.

Applying our method to a circular arc, no error at all could be detected.

Furthermore, in its application to long sweeps, this method gives excellent results.

For an actual calculation, the irregular curve *A-B* has to be marked with a series of numbered points and traced with these points. After turning the second paper over, the marked points of curve *A'-B'* should be numbered to conform with the marked points of *A-B*. After this the successive normals can be constructed rapidly.

Hydrogen Brazing

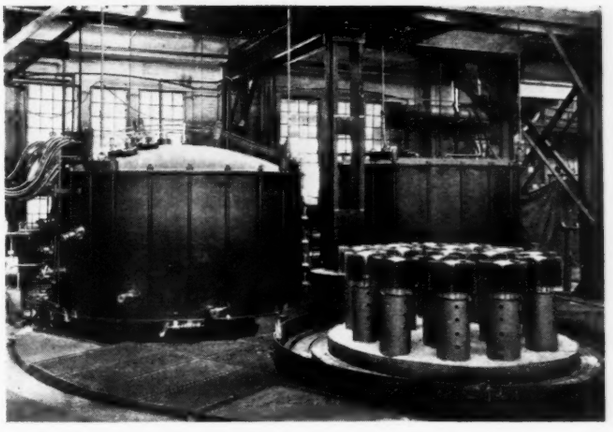
BY the use of atmospheres of protective gas in electric furnaces, steel parts used in the manufacture of complicated assemblies can now be conveniently united by a strong alloy weld which would be exceedingly difficult to accomplish by other means. This method, known as hydrogen brazing, involves the welding together of the parts to be joined by means of a copper flux.

This process of copper brazing, while not new, has heretofore been attended by a number of practical difficulties in application. Marked improvements in the equipment used are now announced by the General Electric Co., in whose laboratories considerable development work has been going on for a number of years. As a result, the method may now be applied successfully to many operations with resulting simplification of method and reduction of overall costs.

Electric furnaces of small size, utilizing protective atmospheres, have been used in laboratories for brazing by this method for some years. An early and important use was the manufacture of steel shafts for golf clubs. The advantages of the process were quickly recognized, and a gradual development of suitable equipment followed.

The theory of the process involves the reducing action of a hydrogenated atmosphere, which thoroughly cleans the surfaces to be joined, and the capillary attraction of the fluid copper, causing it to diffuse quite generally over the surface and to be drawn into the minutest joints between the parts. The protective atmosphere is essential during the cooling portion of the cycle also, and for this reason the usual type of furnace cannot be used.

A typical hydrogen brazing furnace used in the Schenectady plant of the General Electric Co. consists of three "stages." Each stage is in the form of a platform. Covers which may be raised and lowered are provided for two of the stages. The work to be brazed is first assembled on one stage, copper wire or chips being placed adjacent to the joints to be united. The assembly is then placed in the heating chamber at a suitable temperature, and the next stage loaded. When the first assembly has been suitably heated over a predetermined period of time, it is withdrawn from the heating chamber and placed in a cooling chamber, the second assembly automatically moving into the heating chamber. Thus the heating, cooling and assembly may take place at the same time.



Typical hydrogen brazing furnace

Another application on which the protective gas envelope is used to advantage is bright annealing steel in sheet or fabricated form, for nickel, monel and certain other non-ferrous metals, to save the cost of annealing pots, handling, picking, etc. In such work, a furnace of the continuous type is used, designed for larger output. The work is loaded on suitable trays arranged to be pushed through the furnace on a roller track. An elevator raises the trays into the furnace at the entrance end and a similar elevator is used to remove them from the discharge end.

Lycoming Cylinder Blocks

(Continued from page 915)

The barrels are finish reamed in Foote-Burt single spindle, heavy duty drills. Two machines are employed with one man operating both of them. No fixtures are used for this operation.

A single spindle Avey drill equipped with angle plate fixture with rack and pinion for positioning, is employed to finish ream the valve stem guide holes. The valve stem guides are then pressed into place by a Logan pneumatic press.

Holes in the valve stem guides are reamed in another Avey single spindle fitted with the same type of fixture. Two operators are required for the three preceding operations.

Two Moline semi-automatic, Oil Gear driven, single spindle lapping machines are employed to rough lap the barrels. The fixture used is of the base plate type and is fitted with a pin plunger for locating. One man operates each machine.

The connecting rod clearances are end milled next in a Natco 8-spindle gang drill fitted with a two-position, indexing, angular fixture. One man is required to run this machine.

The final operation is finish lapping, performed in the same manner as rough lapping, in a Moline Oil Gear lapper. The blocks then pass through a Blakeslee tunnel washer to the final inspection bench.

Oil *Passages* in Connecting Rods Are Welded at *Low Cost*

Provides satisfactory solution to problem of lubricating pin bearings by pressure without expensive gun drilling of rods. Comparative costs of two processes given.

THE common method employed in most automobile engine designs to lubricate the piston pin and bearings has been by splash or spray. The particular conditions affecting the operation of the piston pin appear to call for more effective means of lubrication than this and, in fact, in many of the better grade engines this pin is lubricated by pressure, the lubricant being carried from the crank bearing to the pin bearings through a hole drilled in the rod itself or through a tube fastened to the rod.

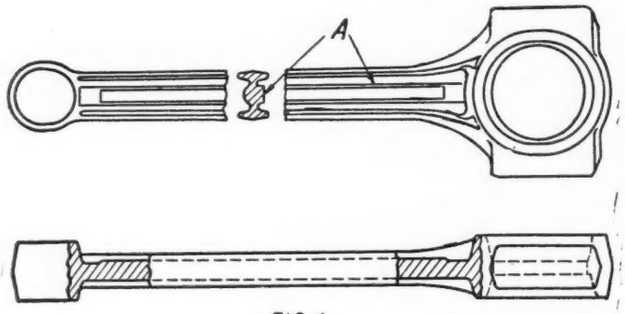


FIG. 1

While these methods serve very well from the lubrication standpoint they each have certain disadvantages which have limited their use considerably. The method of using a pipe or tube has been generally unsatisfactory because of its tendency to get loose no matter how it is clamped or otherwise fastened to the rod.

The method of drilling a hole through the rod from one bearing to the other is quite satisfactory from a lubrication standpoint but the operation is so expensive to perform that it cannot be done economically except on engines for rather high priced cars.

As told by M. J. Clark in his paper submitted in the competition for the prize offered by the Lincoln Electric Co. one well known company has employed arc welding to obtain the advantages of the drilled rod at a little over half its cost. The way in which this has been done is shown in the accompanying sketches which indicate the various steps in the procedure.

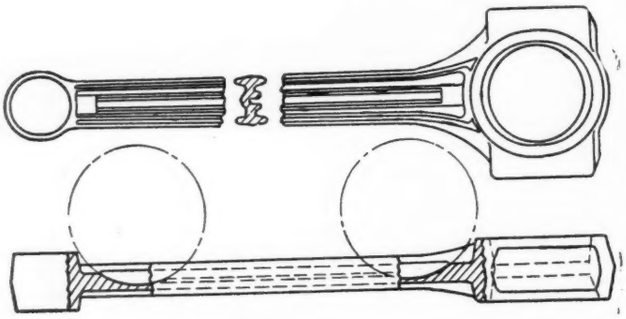


FIG. 2

The object accomplished was to provide an open conduit or channel from a point near the crank bearing to a point near the pin bearing and then by folding and arc welding the seam of the fold to form a passage which could be connected with the two bearings by relatively short drills.

Fig. 1 shows the design of the forging developed for this purpose. Additional stock is left at *A* for formation of the open channel by milling as shown in Fig. 2. A power press is then brought into play and the sides of the slot are folded over until they meet, as shown in Fig. 3. Then the seam is arc welded to form a perfectly tight oil passage through the center of the rod.

Each end of this inclosed passage is then connected with its bearing by a simple drilling operation as shown in Fig. 5. The hole in the small end is drilled at an angle while that in the crankpin end is brought into line with the oil opening in the crankpin, admitting oil under pressure to the connecting rod to be carried to the piston pin bearings.

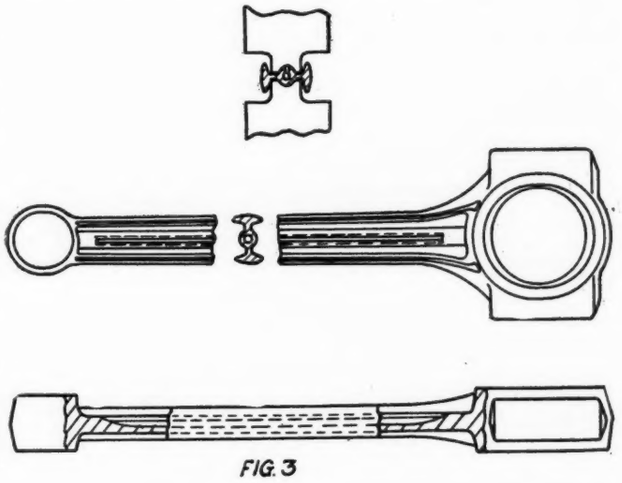


FIG. 3

Since this method of forming an oil passage results in the same lubricating characteristics as those obtained by so-called gun drilling, the only advantage the arc welding method may have is in cost of production. From the records of the company which is now forming oil passages by arc welding the savings per rod in using it rather than gun drilling are $.1648.

The comparative costs figures are made up as follows:

Cost of Gun Drilling

Cost of drill and tip complete.....	$5.20

Cost of upkeep of drill and tip:		
Average number of holes per grind	4	
Average amount removed from drill per grind	1/16 in.	
Average number grinds per tip	32	
Average grinding and repair time	.25 hr.	
Total grinding and repair time—one tip	8 hr.	
At $1 per hr., direct labor only, total cost of starting a new drill and tip would be 8 x 1.00 x 300% overhead		$24.00
		$29.20
This total cost is for 128 pieces so that the cost of drill and tip per piece is		$.228
After the first cycle this cost will be reduced as the drill shank has a longer life than the tip. The next 10 cycles will include cost of tips and grinding only to give a total cost of $26.50 per 128 pieces or cost per piece		.207
Average cost per rod drilled during life of shank or tip of 11 complete cycles		$.218
To this must be added the cost of labor for running machines which is $.052 per piece x 300% overhead or		.156
Total cost of labor and drills per rod		$.374

Cost of Arc Welding

Cost of forging rod, milling slot and folding over		$.44

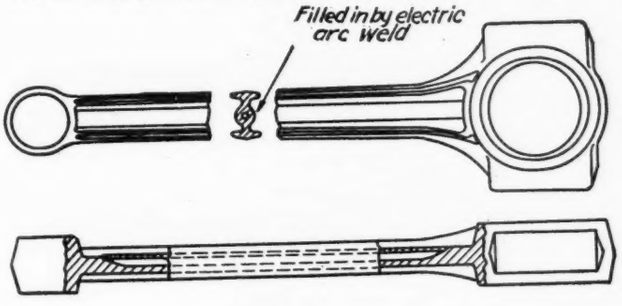


FIG. 4

Cost of forging rod without these additional items		.29
Additional cost of forging for welded rod		$.15
Cost of arc welding—direct labor	$.0038	
Cost of drilling to open passage at both ends —direct labor	.0150	
	$.0188 x 300%	.0564
		$.2064
Cost of welding material and tools		.0028
Total cost of operation		$.2092
Cost for gun drilling rods	$.3740	
Cost for welding rods	.2092	
Savings per rod by welding	.1648	

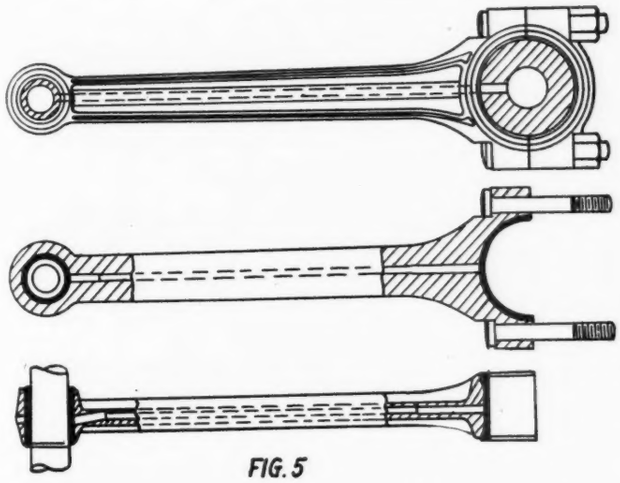


FIG. 5

This means something over one dollar saved for every six-cylinder engine reproduced by the welding method.

Radiator Production

(Continued from page 908)

3. Flanges are next trimmed off by roller cutters and the shells pass onto

4. Niagara presses for the expanding of hood beads, etc. (See Fig. 6.) Up to this time the centers have been left in. They now pass to

5. Niagara presses for blanking out centers. These centers are not scrapped but used to make radiator core side walls, etc., as far as possible.

6. Minor pressing operations to complete the shell form are then performed, including such items as name plate hole blanking, filler hole forming, punching of hood lacing holes, etc.

7. A number of automatic eccentric operated hammers are provided to take out draw marks, the eccentrics being belt driven. After washing, the shells are hung on the conveyor which takes them to the plating division on the floor above.

Here separate layouts are provided for cyanide copper, acid copper, nickel, and chromium baths, but all groups are arranged consecutively and connected by the chain conveyor, which eventually takes the plated shells across a bridge and delivers them to the shipping room in the other building, the arrangement permitting the elimination of any one operation, such as chrome plating.

Assembly of Shells and Cores

The assembly of shells and cores is performed on the fixtures shown in Fig. 5. The shell is placed on the table, the core is inserted and pressed in by means of a lever-operated wooden eccentric with blocks of wood between eccentric and core. Assembly bolts and nuts are tightened by means of electric hand tools.

Assembled radiators are immediately placed in crates and these placed on a belt conveyor which ejects them on a gravity conveyor passing through an aperture in the shipping room wall, which in turn delivers them directly into the freight cars, short pieces of roller conveyor being provided for this purpose. In cases where cores only are shipped, these are not crated but loaded directly in the freight cars, spaced by wood planking. Fig. 7 shows the latter.

Of course, as in all plants, changes are being made in the layout, but the general problem has been solved. Everything is designed so as to work toward the shipping platform; closely allied groups of operations are located in the same division, and each core or shell for whatever type of vehicle is in the same stage of manufacture when it passes from department to department or floor to floor, while material handling has been reduced to almost the absolute minimum, considering the variety of types to be produced.

IN a paper presented before the Iron and Steel Institute of Great Britain by A. B. Everest and Dr. D. Hanson of the National Physical Laboratory, on the influence of nickel in iron-carbon-silicon alloys containing phosphorus, the conclusions were reached that phosphorus increases the hardness of the iron, increases its tendency to chill and renders it difficult to machine. In the absence of chill, nickel produces its normal hardening action.

Huge Air-Cooled *Airplane* Engine *Develops* Nearly 800 B. Hp.

14-cylinder "Leopard" radial, introduced by Armstrong Siddeley of England, has induction fan geared to run at higher speed than crankshaft. Four valves per cylinder.

By M. W. Bourdon
British Correspondent

ARMSTRONG SIDDELEY MOTORS, LTD., Coventry, England, whose airplane engines have been widely used and whose Jaguar model, 14-cylinder air-cooled radial has been standardized for many years past has produced a larger and modified design of that type. Known as the Leopard, it has the same number and arrangement of cylinders as the Jaguar and follows the same general lines throughout, consisting of two "banks" of seven cylinders each mounted radially on the crankcase.

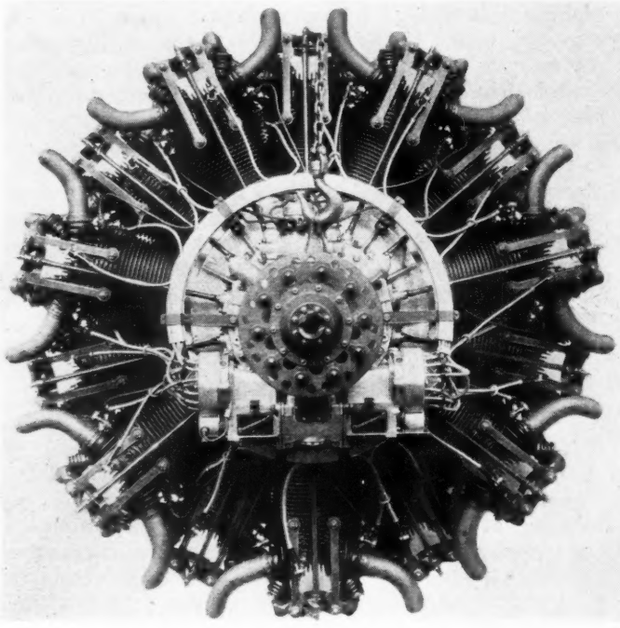
The new model, rated at 700-750 hp. has been designed for use in torpedo, heavy bombing and load-carrying aircraft, and is believed to be the most powerful air-cooled radial engine now in production. With a bore and stroke of 6 by 7½ in. and a compression ratio of 5 to 1, it develops 700 b.hp. at 1500 r.p.m. and 777 b.hp. at 1650 r.p.m. Its weight complete for installation with bearer plate, propeller boss, dual ignition, carburetor, air intake and short exhaust pipes is 1415 lb.

The principal departure from the Jaguar design (which was described and illustrated in *Automotive Industries* of Nov. 16, 1922), is that the induction fan, which distributes the mixture to the various cylinders, is geared to run at a higher speed than the crankshaft in order to obtain a better volumetric efficiency, and that four valves are fitted to each cylinder instead of two, this being rendered necessary by the increased cylinder capacity.

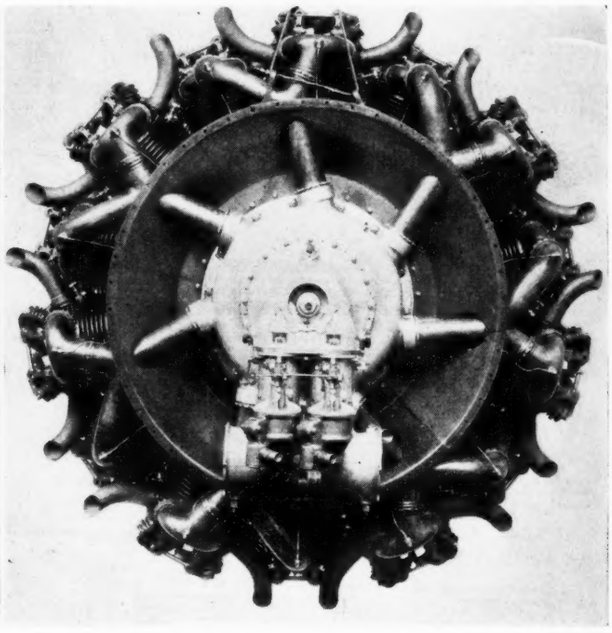
The crankcase is a one-piece aluminum casting, the front portion carrying the tappet guides, a spigot supporting the front cover and the front crankshaft bearing. The central portion, or barrel, which carries the cylinders, is heavily webbed inside and outside, while the rear portion has a spigot to support the induction fan and casing, the fuel pump, carburetor and the rear crankshaft bearing.

The steel cylinder barrels, machined all over, are secured to the crankcase by clamping rings of wedge section. The cylinder head, an aluminum casting, finned to secure the maximum cooling effect, is screwed and shrunk on to the cylinder barrel, where it is secured permanently by a threaded locking ring, the joint being steel-to-aluminum, without gasket of any kind.

The two inlet and two exhaust valves per cylinder



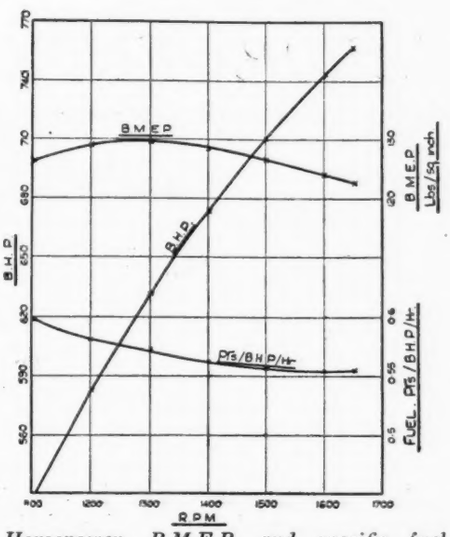
Armstr ·g Siddeley 14-cylinder radial air-cooled engine, propeller end



Armstrong Siddeley engine seen from induction end

are operated by rockers, which pivot on two spindles mounted on the cylinder head. The spindles at their rear ends are anchored to the top of the head; their front ends are supported by a compensating bracket which is anchored to a point near the bottom of the cylinder head. This bracket is of special steel having a very low coefficient of expansion, with the result that the longitudinal expansion of the cylinder has practically no effect on the tappet clearances.

The valve rockers are operated by pushrods and tappets from the cam drum, which is located inside the front portion of the crankcase, the tappet clearance adjustment being on the pushrods. The valve seats and valve guides are renewable, the former being screwed and shrunk into the heads, while the latter are a press fit. The spark plugs are accommodated in adapters screwed and pegged into the heads. The cam drum has three inlet cams and three exhaust cams and rotates at one-sixth crankshaft speed. Rollers and tappets transmit the cam motion to the pushrods.



Horsepower, B.M.E.P. and specific fuel consumption curves of Armstrong Siddeley engine

The pistons are machined all over from "Y" alloy forgings. Each carries two compression and one scraper ring, all three rings being above the piston pin. The air-hardening-steel piston pin floats in the piston and connecting rod bush, and is located axially.

Connecting Rods

Each bank of seven cylinders and pistons drives the crankshaft by means of one master and six auxiliary connecting rods. The large end of each master connecting rod carries six anchor pins, to which the inner ends of the auxiliary rods are anchored. The master connecting rods are bushed to take the anchor pins, which float in the bushes and are spaced so as to give an equal compression ratio in every cylinder. The master connecting rods bear on the crank pins by means of white-metalled bushes, which are made in halves and prevented from turning in the master rods by dowels.

The crankshaft is made in one piece and has two throws set 180 deg. apart, each crankpin carrying one master rod and six auxiliary connecting rods. It is bored for weight reduction, and the holes serve the purpose of distributing the lubricating oil. It is carried by two large roller bearings, one located just behind the rear crank throw and the other just in front of the front crank throw. The crankshaft extends beyond its front roller bearing and this portion carries the timing gear and cam drum, a bevel gear (which drives the oil pumps, magnetos, gas distributor and C.C. gun gear), and the propeller thrust bearing. The rear end carries the spur gear to drive the induction fan. The front and rear webs of the crankshaft carry the necessary balance weights.

Mixture is supplied to the engine by a Claudel Hobson A.V.T. 100 carburetor through the medium of the induction fan which delivers the mixture into an annular induction casing. Thence the mixture passes to the cylinders by means of induction pipes. Experiments have proved that the use of an induction fan of this kind very considerably increases the volumetric efficiency of the engine and also gives a perfectly even distribution to all cylinders.

The carburetor is supported on an induction elbow attached to the rear end of the engine, the controls and air intake pipes being integral with the carburetor and engine. Ignition is effected by two magnetos, each with 14 terminals; they are accessibly mounted on the front of the engine and are bevel-driven from the crankshaft.

The oil pumps are mounted on the front of the engine and are also bevel-driven from the crankshaft. The pressure pump, with relief valve, delivers oil through a filter to the center of the crankshaft and thence to the connecting rods and bearings. At the bottom of the crankcase is an oil sump to prevent flooding of the lower cylinders when the engine is stationary. Oil is drawn from this sump by a scavenging pump under the pressure pump, and is delivered to the oil tank on the aircraft. On its way to the tank, the oil passes through the jacketing of the carburetor and induction elbow, thereby positively heating the induction system.

A gear type fuel pump and relief valve are carried at the rear end of the engine, with a tachometer drive just above; this drive projects toward the rear of the engine to avoid unnecessary bends in the tachometer flexible shaft.

Provision for priming is made by fitting a distributing ring at the rear of the engine, the ring having small branch pipes leading to each induction pipe, each branch pipe terminating in a small atomizing jet. Attached to the rear end of the engine is a conical bearer plate, by means of which the engine is mounted in the aircraft.

Stewart Speed Truck

STEWART MOTOR CORP., Buffalo, N. Y., has introduced a new three-ton fast, heavy-duty model equipped with six-cylinder engine, four-speed transmission and four-wheel brakes. This new unit is furnished in 165 in. standard wheelbase and 147 in. short wheelbase, although it is also available in the following special wheelbases: 176 in., 190 in. and 220 in. The price is $3,490.

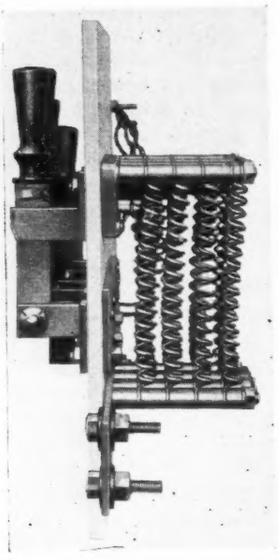
The engine, which is of the bus type, has a bore and stroke of 3⅞ by 5 in., developing 75 hp. Head and block are removable and a Swan-type manifold is used. The crankshaft is 2¾ in. in diameter. Full force feed to all bearings is employed and connecting rods are rifle drilled to supply the piston pins. Starting, lighting and ignition are furnished by Delco-Remy equipment. The fuel line includes a 31-gal. gasoline tank with gage, Stromberg carburetor, gas filter and air cleaner. The radiator is of the cast-tank type with polished aluminum top tank.

Power is transmitted to the full-floating, worm-drive Timken rear axle through a multiple disk clutch and a four-speed transmission. Braking is Bendix.

NEW DEVELOPMENTS—Automotive

Optimus Rheostat

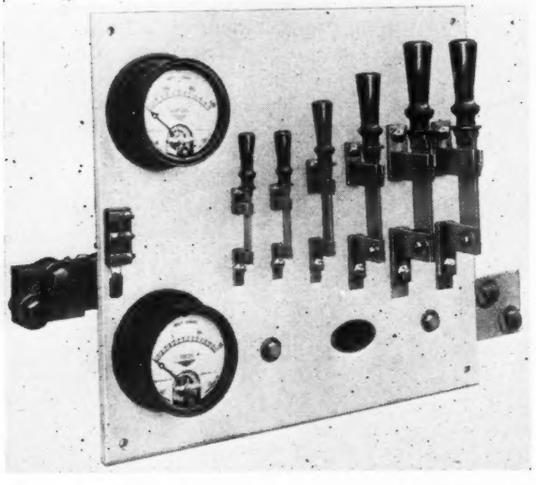
THE Hanson-Van Winkle-Munning Co., Matawan, N. J., has developed the Optimus rheostat designed to furnish absolute control and regulation of plating baths of all kinds and to simplify the operation of all plating solutions.



Coil arrangement and stud mounting of Optimus rheostat

With this device the operator can adjust the total resistance of a plating tank circuit so as to regulate the current density in the plating bath itself. Thus the plater can maintain a constant voltage drop from anode to cathode regardless of changes in area of the cathode surfaces in the tank. As the tank voltage regulates the current density of plating, the average thickness of deposit in a definite time is also controlled by this means.

The rheostat is equipped with voltmeter and ammeter mounted on the panel. The instrument and shunt are physically arranged to avoid distortion in the readings. The voltmeter permits the plater to read the line voltage and the voltage drop while the ammeter shows the total current passing through the solution.



Optimus plating rheostat for controlling all plating solutions

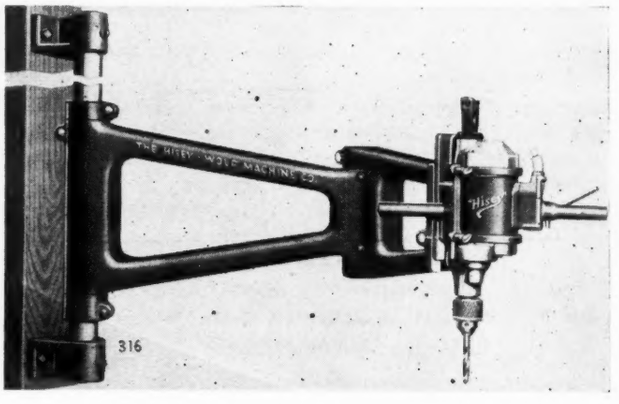
Improved Paint Spray

THE Alexander Milburn Co., Baltimore, has improved its line of paint spray equipment and has brought out a new line of spray guns designated as Type EE which are designed so that all operations can be definitely controlled by the operator. A dialed head which gives numerous different sprays from fan shaped to solid streams permits the operator to obtain any desired type immediately without experimenting.

A series of indicator numerals has been placed on the paint valve plunger and a pointer is operated by the adjustment button. This permits the operator to set the equipment for the exact volume which experience has proved most desirable without testing each time the gun is used.

Radial Arm for Drills

THE Hisey-Wolf Machine Co., Cincinnati, has brought out a double radial arm which can be furnished for all Hisey portable electric drills up to and including ⅞ in. capacity. The lever feed is operated through rack and pinion as in a drill press, thereby providing sensitive and positive control. The motor holding brackets are designed so that the drill can be attached without removing any parts. The arm is mounted on a ball thrust bearing which permits easy adjustment. Either the long or the short arm can be locked independently.



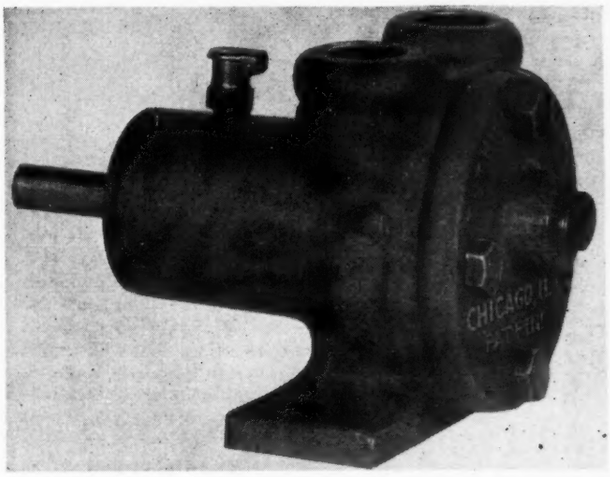
Hisey-Wolf double radial arm for portable drills

Vertical adjustment through the rack and pinion is 7½ in.; vertical adjustment up and down on the main column is 25 in. making a total of 32½ in. possible vertically. The full arm swings through 240 deg. while the short arm swings through 245 deg. Maximum arm reach from column to drill spindle is 36¾ in. Net weight is 215 lb.

Tuthill Oil Pump

A RECENT development of the Tuthill Pump Co., Chicago, is a small, high pressure, packingless pump designed for pressure lubrication of machine tools and for hydraulic feeds. It operates on the internal gear principle like other Tuthill pumps but has a "two-zone" packingless feature, employing a patented metallic seal which insures freedom from leakage at pressures as high as 500 lb. per sq. in. and 28 in. of vacuum.

Parts, Accessories and Production Tools



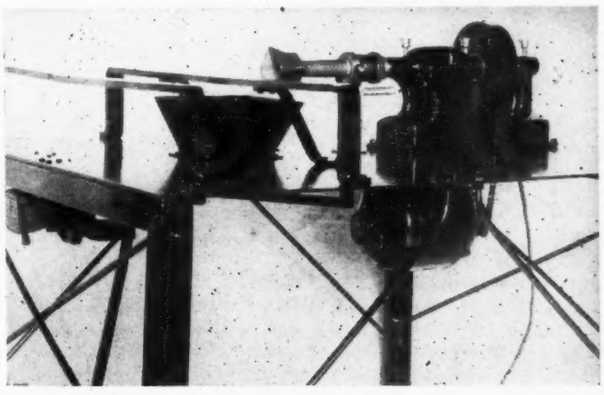
Model B Tuthill high pressure pump with foot mounting

Two sizes are available, one of 30 gal. per hr. capacity and the other of 90 gal. per hr. Both operate at 1800 r.p.m. Either size may be obtained with either foot or flange mounting, the latter being convenient for pumps built integrally with the machine. These pumps are designated Models A and B respectively.

A third model, C, is designed for pressures up to 200 lb. per sq. in. on lubricating oil and can be furnished in various sizes to supply from 1.5 to 45.5 gal. per min. at 100 lb. pressure and at 1200 r.p.m.

Nut Driving Machine

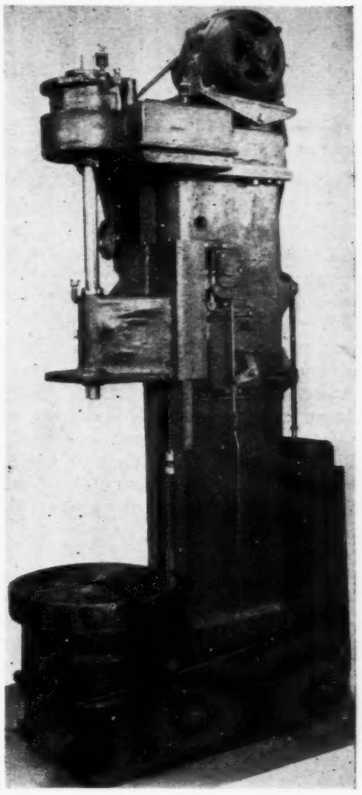
PROCUNIER SAFETY CHUCK CO., Chicago, has developed a nut driving machine equipped with a safety friction clutch. A bench tapping machine is mounted on a special table and is equipped with a sprocket wrench and a safety clutch. The machine is driven by a motor and chain. The clutch slips when the nut is driven home, further protection being provided by an electrical overload switch that breaks the circuit if the machine is overloaded. Direction of rotation can be reversed to back off nuts.



Procunier nut driving machine

Baker Drilling Machine

BAKER BROS., INC., Toledo, has developed a hydraulic feed boring and drilling machine known as No. 10 H. The saddle is of a type which permits the attachment of any style head either single or multiple spindle. A plain table can be fitted for single spindle work or with an indexing table with any number of indexes.



Baker Oil Gear boring and drilling machine. A multiple head can be attached to the flanged head shown

The machine is motor-driven, the motor being mounted at the top of the machine. Tex-Rope drive is used. The drive for the Oil Gear pump is belted from the main driveshaft so that only one motor is required. Speed changes are made by slip change gears while the wide flexibility of the hydraulic mechanism is available for feed changes.

Features of the machine include rapid advance to work, automatic tripping to proper work feed and rapid return, the points of change being adjustable by cams mounted on the side of the saddle.

Speed range of the main vertical shaft is from 165 r.p.m. to 245 r.p.m. Other speeds can be provided as special equipment. The head has a 16-in. travel. The motor is 10 hp., 1200 r.p.m.

THE Bureau of Standards has worked out two methods for observing and recording the flexing of tire treads. One method consists in observing the flexing of the tread through a heavy plate glass. By the other method a piece of sheet metal is given a thin coating of soft wax and is then sprinkled sparingly with grains of carborundum. A tire under the desired load and air pressure is rolled over the waxed plate, the carborundum grains stick to the tire and each traces on the plate the movement of the particular point on the tire to which it happens to stick. Some very interesting information concerning tread movements was obtained in this way, and the method has the advantage that it can be carried out with very little equipment.

AUTOMOTIVE NEWS SECTION INDUSTRIES
Philadelphia, Pennsylvania
June 16, 1928

First Five Months' Output Close to Industry's Record

PHILADELPHIA, June 16—The automobile industry continues to confound the pessimists. The late spring season has shown less evidence of slackening than any in recent years, and estimated May production of 443,700 cars and trucks, if borne out by final figures, will mean a record for the month for all time. For the year to date, production is less than 100,000 units under the record made in 1926.

In the first five months of 1928, roughly, 1,877,460 cars and trucks were produced, comparing with 1,746,977 last year in the corresponding period, and with 1,970,685 in 1926. From all present indications, the margin of 1926 over this year will continue to be reduced in the months immediately ahead.

One important company has been nearly out of production for some weeks in preparation for new models, and is now getting rapidly under way. Ford continues to increase output, and these two contributions should almost, if not entirely, compensate for the slackening a majority of the factories are undergoing this month in line with the seasonal trend.

Sales have been stimulated by the elimination of taxes on automobiles, and very heavy deliveries are being made this month, which should bring large reduction of dealers' stocks before the summer slump is felt.

G.M. Retail Deliveries Rise to 224,094 in May

NEW YORK, June 15—Retail deliveries of General Motors cars in May totaled 224,094, setting a new high record for the third consecutive month. Deliveries in April totaled 209,367 and in May, 1927, totaled 171,364. Shipments from factories to dealers in May totaled 207,325 as against 197,597 in April and 173,182 in May, 1927.

Jordan Announces New Air Line Eight Series

CLEVELAND, June 11—A new series Air Line Eight was announced today by Jordan Motor Car Co. Three models: Playboy coupe, sedan and victoria will be priced at $1,995. Improvements include a new aero type engine with 85 hp. instead of 80 in the previous model, and provision for de luxe equipment.

Manville Sales $10,144,156

NEW YORK, June 14—Johns-Manville Corp. and subsidiaries report sales for the first quarter of 1928 as $10,144,156, and income after all charges is placed at $772,705. This being the first quarterly statement made by the company, comparisons are not available.

Car Tax Reduction Now General Trend

NEW YORK, June 14—Worldwide action toward the reduction of motor car taxes is indicated by John N. Willys, chairman of the foreign trade committee of the National Automobile Chamber of Commerce, in the annual report of that committee issued this week. Chile, Peru and the United States are cited by Mr. Willys as among the countries which have recently taken this step.

"The repeal of the Federal war excise taxes on the automobile by the U. S. Government is but an indication of a worldwide tendency," said Mr. Willys. "Motor transportation is coming increasingly to be recognized as an economic necessity in all lands."

Foreign Makers Accept Offer

NEW YORK, June 14—Following closely upon the invitation to foreign car manufacturers to exhibit at the 1929 New York show, S. A. Miles has announced that applications for exhibition space have been received from British, French and German manufacturers' associations. Applications from other countries are expected also and when all are received space will be apportioned for the foreign exhibits on the third floor of Grand Central Palace.

The invitation to the foreign makers was made through the Bureau Permanent International des Constructeurs d'Automobiles in Paris, to which A. J. Brosseau and J. D. Mooney were delegates representing the National Automobile Chamber of Commerce, by which the offer was tendered.

Hasse Joins Valentine

NEW YORK, June 14—O. A. Hasse, executive vice-president of the Glidden Co., has resigned as an officer and director to become associated with Valentine & Co., Inc. Mr. Hasse, after 13 years with the Sherwin-Williams Co., became one of the organizers of the Glidden company and has served as its senior vice-president since its formation.

80% of Chevrolets Go to U.S. Buyers

DETROIT, June 11—More than 80 per cent of the 140,700 cars and trucks built by Chevrolet Motor Co. in May were absorbed in the United States market, according to W. S. Knudsen, president. The increase in May output was due largely to the first full month's operation of the Atlanta plant, Mr. Knudsen said. Several other domestic plants have been expanded and the opening of the Kansas City assembly plant later in the year will make further increased production possible. The company reached a new high day production total on May 28 when 7075 cars and trucks were built.

Rosengart to Produce Baby Austin in France

PARIS, June 5 (*by mail*)—Lucien Rosengart, at one time associated with Citroen and later general manager of the Peugeot Automobile Co., has made arrangements to produce the English Baby Austin in France and announces 60,000 cars for the first year. This car is one of the smallest on the European market, having a four-cylinder engine of 2.2 by 2.99 in. bore and stroke, or 45.6 cu. in. and a wheelbase of 75 in. It will be sold in France with three-seater sedan body at about $600.

The company responsible for the new car has both Austin and Chenard Walcker backing and the intention is to make use of the Chenard Walcker commercial organization for marketing the new model in France. Although the approaching appearance of this car is quite unknown to the French public, it is declared that orders for 7000 have already been registered.

Chevrolet Buys Equipment

CLEVELAND, June 13—A $700,000 contract for machinery and equipment has been awarded the C. O. Bartlett & Snow Co. by Chevrolet Motor Co. The order includes machinery for handling foundry materials and products; devices for reclaiming sand in castings; elevators and screening machines.

O'Brien Leaves Duplex

LANSING, June 13—Thomas T. O'Brien has resigned as sales manager of the Duplex Truck Co. It is understood that Mr. O'Brien intends to remain in Lansing. He was formerly connected with Olds and Reo.

Studebaker and P-A Study Merger Plan

Statements by Erskine and Forbes Show Proposals Under Investigation

BUFFALO, June 13 — Myron F. Forbes, president of Pierce-Arrow Motor Car Co., returned Wednesday from New York. He said that while there he and A. R. Erskine, president of the Studebaker Corp. of America, had discussed proposals of merging the Pierce-Arrow and Studebaker corporations. Mr. Forbes indicated that no definite conclusions had been reached and the proposal is being further investigated by officials of both companies so that details may be worked out satisfactorily on both sides. Directors of the Pierce-Arrow company met Wednesday afternoon to hear the preliminary terms of the propesed merger. No reference was made to inclusion of Jordan.

A. R. Erskine, president of Studebaker, said in South Bend that informal conferences have been in progress and intimated that further negotiations would follow. "Nothing definite has been settled as yet," he declared.

Studebaker last year earned $11,938,000 and had net income of $3,980,000 in the first quarter this year. Current assets as of Dec. 31, 1927, totaled $50,509,000 against current liabilities of $14,456,000. Total assets were $135,877,947. Capital stock outstanding consists of $7,425,000 7 per cent cumulative preferred of $100 par, and 1,875,000 shares of no par common.

Pierce-Arrow showed a deficit of $783,000 in 1927. Current assets at the end of 1927 totaled $12,943,000 and current liabilities $1,560,000. Total assets were $24,373,082. Capital stock outstanding consists of $10,000,000 8 per cent cumulative preferred stock and 328,750 shares of no par common. Funded debt consists of $3,349,200 debentures (8 per cent) due 1943, and $1,658,000 of purchase money obligations. Arrears on preferred dividends totaled $4,400,000 as of Jan. 1, 1928.

Durant Plans Further Lansing Plant Additions

LANSING, June 13—Durant Motors, Inc., has increased the amount it will spend in additions to the Lansing plant to $1,250,000, according to W. R. Willet, assistant to W. C. Durant. Of the amount, $750,000 is to be spent in a new factory, $250,000 in additions to the steam power house, and $250,000 for equipment for the new factory, which will be a body division. Stories that have been current recently to the effect that Durant will move the Elizabeth plant to Lansing were denied.

Tire Prices Down 10 Per Cent

AKRON, June 14—Price reductions averaging 10 per cent on all classes of tires were made effective this week by leading tire companies following reduction by Firestone Tire & Rubber Co. The Firestone reduction ranged from 4 to 17 per cent, the largest reduction being on sizes that have become practically obsolete. The reductions have been made in spite of severe inventory losses to overcome dealer sales resistance.

Balloon Tire Patent Invalid, Rules Court

DETROIT, June 14—Judge Tuttle in Federal District Court here today held the Putnam patent on balloon tires invalid and void in the suit brought by Steel Wheel Corp., owner of the patent, against the B. F. Goodrich Rubber Co. The decision was based upon three grounds, prior publication, prior use and claims indefinite and uncertain. No statement was made by the Steel Wheel Corp. relative to an appeal.

Graham Brothers Trucks Changed to 6-Cylinder

DETROIT, June 16—A complete line of six-cylinder trucks with larger capacities, longer wheelbases, four-wheel brakes and other changes in construction and appearance, has been announced by the Graham Brothers division of Dodge Brothers, Inc. The new six-cylinder models supplant the four-cylinder trucks in all capacities. Prices are $775 for the commercial truck, $995 and $1,065 for the 1½-ton, $1,345 and $1,415 for the 1¾-ton, and $1,595 and $1,665 for the 2½-ton. The Merchants Express model equipped with panel body is $845 and the chassis price is $665.

G.M.C. and Willys Pay for New Highway Markers

NEW YORK, June 12—The Lincoln Highway will be remarked this summer, a system of square concrete posts being used which will have on their face the familiar marker with a medallion of Lincoln and on the side facing motorists, a directing arrow. The cost of the new markers will be financed by General Motors Corp. and Willys-Overland Co.

Thompson Promotes Colwell

CLEVELAND, June 14—A. T. Colwell of Thompson Products, Inc., has been made sales and engineering representative of the original equipment division for the state of Michigan. Mr. Colwell has been with Thompson Products for six years, traveling two years in the company's Eastern territory from the Cleveland office, and the last four in Michigan, from Detroit.

Fisher Adds Pontiac Unit

DETROIT, June 13—Fisher Body Co. will build a $2,000,000 press room addition to its Pontiac plant. The plant will handle press work now done in the Walnut St. plant and will result in consolidating all Fisher activities in Pontiac in one unit.

Business in Brief

Written exclusively for* AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co.

NEW YORK, June 14—Developments in financial markets continue to dominate the business scene. The downward movement of stock prices gained momentum last week, and on Monday of this week the decline was probably the most pronounced since the beginning of the year.

The firmness of money rates, which apparently gave the first impetus to the market reaction, likewise continues, though call money has receded slightly from the peak figure of 7 per cent reached on June 4. The 4½ per cent rediscount rate was made uniform throughout the Federal Reserve system by the advance of the rate at Kansas City last week.

FEDERAL RESERVE REPORT

The use of bank credit for loans against security collateral declined during the first week of June. Although loans to brokers and dealers, secured by stocks and bonds, made by reporting member banks of the Federal Reserve system in New York City increased $94,000,000 to a new peak of $4,563,000,000, security loans elsewhere more than offset this advance, so that loans of this type made by all reporting member banks declined $48,000,000.

Borrowing from the reserve banks continued to increase, discounts of the central institution increasing $38,000,000 during the week ended June 6. There was, however, a net decline of $8,000,000 in aggregate holdings of bills and securities.

GENERAL TRADE

Cool, wet weather again hampered retail trade to some extent last week, although the rainfall in many sections was beneficial to crops. In the South, both trade and agricultural work would be helped by dry weather and higher temperatures.

FREIGHT CAR LOADINGS

Some improvement in the distributive movement is indicated by the movement of railway freight. Loadings during the week ended May 26 numbered 1,020,916 cars, which is 17,419 cars more than in the preceding week and only 5873 cars below the total a year ago.

BANK DEBITS

A gain also occurred in bank debits to individual accounts outside of New York City during the week ended June 6, the total being 19 per cent larger than that a year earlier. The increase, however, is probably due mainly to the fact that this year's total includes the heavy transactions of the first of the month.

FISHER'S INDEX

Commodity prices scored the third successive decline last week, Professor Fisher's index standing at 97.6, as compared with 98 a week earlier and 99.6 a month ago.

Chrysler and Dodge Have $44,000,000 Cash

Combined Current Assets Total $112,000,000 Against Liabilities of $36,000,000

NEW YORK, June 11—The combined balance sheet of the Chrysler Corp. and Dodge Brothers, Inc., as of April 30, adjusted to give effect to the consummation of the consolidation plan, shows current assets of approximately $112,000,000 of which cash and marketable securities alone aggregate $44,000,000 as compared with current liabilities of approximately $36,000,000. Total funded debt amounted to $61,168,000.

Chrysler Corp. has called all its outstanding preferred stock for redemption and to provide the necessary funds the company will offer to the holders of its common stock, rights to purchase approximately 453,000 additional shares at $57.50 a share. On issuance of this additional stock and of stock to the full amount required to provide for all Dodge Brothers stock on the basis mentioned in the purchase plan, only one class of stock will be outstanding.

Per share earnings on the 4,423,484 shares of common stock which will be outstanding under the plan, with the companies' earnings combined, in 1925 would have been $9.74 a share, in 1926 $8.77 a share, $6.74 in 1927, and $2.46 for the first four months of 1928. Combined earnings in these periods were, respectively, $43,090,010, $38,780,357, $29,834,801 and $10,862,974.

A committee has been named to receive deposits of Dodge Brothers' stock and June 25 has been fixed as the last day for making deposits.

New Borg-Warner Units Earned $1,440,000 to May

CHICAGO, June 11—Borg-Warner Corp. is offering 35,000 shares of $100 par cumulative 7 per cent preferred stock and 410,000 shares of the $10 par common stock are outstanding and have been admitted to listing on the Chicago Stock Exchange. Combined earnings of the companies included in the new corporation in the first four months this year were $1,440,000. Earnings for three years of the combined companies were $1,754,501 in 1925; $2,474,414 in 1926, and $3,055,401 in 1927. The company as of Dec. 31, 1927, had total current assets of $7,434,212 and current liabilities of $1,907,457. Cash totaled $2,179,851, marketable securities $800,007, receivables $1,390,462 and inventories $2,982,543. An initial quarterly dividend of $1 has been declared on the common stock.

Falcon Moves Offices

DETROIT, June 9—Falcon Motors Corp. has moved its headquarters from this city to the factory at Elyria, Ohio.

New Plymouth Car Soon to Make Bow

DETROIT, June 12—Trends toward naming new cars after figures and places in American history were heightened by announcement here that a brand new car, soon to make its bow to the public, is to be called "Plymouth." According to announcement the car has been under construction for some time, but formal decision as to its name was not determined until a few days ago. No information as to what company is to build it, its price, size or other details could be secured. The Plymouth takes its name from the best known settlement in the colonization of North America.

Continental to Build Shock Absorber Line

DETROIT, June 11—Within 30 days Continental Motors Corp. will be in production on a line of shock absorbers, marking a departure for the first time from the company's long established policy of making gasoline engines exclusively. The device will be known as the Continental Hydro-check and will be marketed as a part of the regular Continental line.

One of the features of the Continental Hydro-check is that it combines hydraulic and pneumatic cushioning of road shocks. An exclusive feature is the free center air cushion. The shock absorber is of plunger type. The interior is divided into high and low pressure compartments, each containing both oil and air. A compression piston operating in the high pressure chamber is actuated by the arm through a rocker shaft and cam located above oil level in the low pressure chamber preventing leakage.

Elcar Changes Carburetion

ELKHART, IND., June 11—Elcar Motor Co. reports that models in the 8-82 series have been equipped with duplex carbureted engines with aluminum pistons. Performance is now greatly improved, according to W. H. Patterson, vice-president. On brake test the engine now develops 89 hp. and accelerates from 5 to 25 miles in 6.6 seconds.

Auburn Ships 1600 in May

AUBURN, IND., June 11—Auburn Automobile Co. reports 1602 cars shipped in May and a production schedule of 1800 cars in June. Deliveries are 60 days behind on its phaeton sedan model. Registration reports received at the factory indicate May deliveries exceeded shipments by 400.

Automotive Exports Hold High in April

Average for First 4 Months Shows $4,000,000 Gain—Unit Value Lower

WASHINGTON, June 13—The high level of automotive exports was held during April, according to the Automotive Division, Department of Commerce, which placed exports of automotive products for the month at $46,201,256 as compared with $46,168,743 for April, 1927.

For the January-April period, the shipments abroad of American made automotive products amounted to $164,748,938, giving the high monthly average of $41,187,234, as compared with $37,274,801 for the same period in 1927 and $31,342,039 for the 1926 period. The unit value of passenger cars was $736 for the month of April, 1928, as against $739 in April, 1927, and of trucks was $725 in April, 1928, as compared with $636 in April, 1927.

Canada continues to occupy the leading market position for passenger cars, with Australia and Argentina close behind. Sweden, which occupied second position in March, dropped back to eighth position in April. In the truck field Brazil stepped from second position to first during April, followed by the United Kingdom, Canada and Australia.

Contrasting strikingly with the vast amount of exports of motor vehicles is the sharp decline in imports of automotive products to the United States during April. Total imports of all such products during that month amounted to $154,998 as compared with the March figures of $209,232; 31 units valued at $64,751 coming into this country in April, 1928.

Tractor Export Increase

WASHINGTON, June 13—Tractors and motorized equipment of various sorts for agricultural purposes comprised the bulk of exports of agricultural implements from the United States amounting to $33,576,954 in the first four months of 1928, an increase of more than $6,660,000 over the same period of 1927, the Department of Commerce announces.

Philippines Take 321 in May

WASHINGTON, June 13—Imports during May into the Philippine Islands included 211 passenger automobiles valued at 390,000 pesos; 110 trucks, valued at 155,000 pesos, and parts valued at 82 pesos, according to a cablegram to the Department of Commerce from Manila.

Whippet Six Roadster $685

PHILADELPHIA, June 11—The price of $685 on the Whippet Six roadster is the price at which the roadster was introduced early in May.

Piston Ring Makers Fix Trade Practices

Adopt Standards Requiring Accuracy in Sales and Advertising Claims

NEW YORK, June 11—Piston ring manufacturers, at a meeting held under the auspices of the National Better Business Bureau, Inc., adopted a set of standards of trade practices applicable to the advertising and selling of their product.

These standards provide that all claims in advertising and selling attempts be accurate and provable and that technical claims be based on tests made by disinterested authorities. Superlative and ambiguous claims and disparagement of competitor's products are to be avoided.

The accuracy of all claims made in advertising are to be thoroughly established and endorsement claims are to be considered as opinions unless actually based upon average performance and not upon exceptional cases.

Standards adopted covering original equipment claims were as follows:

Claims for use of a product as original equipment by motor manufacturers shall specify the type (compression and or oil) of ring used. Where equipment is not exclusive, the advertisers shall so state.

Those present at the meeting and subscribing to the standards were the following: G. W. Brogan of G. W. Brogan, Inc., representing the American Hammered Piston Ring Co.; J. E. Ruth, Ramsey Accessories Mfg. Co.; Fred G. Ferguson and Paul F. Cropper, Simplex Piston Ring Co.; Merle Sidener, Sidener, Van Riper & Keeling, representing the Perfect Circle Co. and General Piston Ring Co., and F. J. McGinnis of the A. E. Machen Co., representing the Simplex Piston Ring Co.

Steel Men Visit Budd Plant

PHILADELPHIA, June 9—Edward G. Budd Mfg. Co. was host to 200 members of the Philadelphia Chapter of the American Society for Steel Treating this week. A trip through the plant and a dinner at which officers of the Budd company including Edward G. Budd, president, addressed the guests, were features of the visit.

Upset Ferromanganese Rule

NEW YORK, June 12—A decision was rendered by the Court of Customs Appeals on May 28 reversing the decision of the United States Customs Court allowing a ferromanganese compound of specified composition to come in under the Tariff Act. The decision was appealed by the American Manganese Producers Association.

Lakey Business Up 55%

MUSKEGON, MICH., June 11—Lakey Foundry & Machine Co. reports an increase of 55 per cent in business for the first six months of the fiscal year ended April 30 over the same period last year. The company furnishes castings to a number of automobile engine building concerns. In this six-month period 40,669,824 lb. of castings were shipped against 26,260,067 lb. in the 1927 period. A 30 per cent reduction of labor cost and a 30 per cent reduction of foundry scrap were also effected.

Perfect Circle Buys General Piston Ring

HAGERSTOWN, IND., June 11—Perfect Circle Co. has acquired the General Piston Ring Co., Tipton, Ind., and the capitalization of the Perfect Circle company will be increased to $4,875,000. The company is operating on a 24-hour daily basis, is building 4,000,000 piston rings monthly, and reports orders running a month ahead of production.

The management of the reorganized Perfect Circle company will remain the same. The Teeter family will hold two-thirds of the common stock and direct the activities of the entire organization. New directors are Daniel Teeter, former owner of the General Piston Ring Co., and Robert Heller and E. J. Winters, representing banking interests. One-third of the common stock of the company under the recapitalization will be offered for public subscription on or before July 1.

Calorimeter Reorganized

EAST MOLINE, ILL., June 9—The Standard Calorimeter Co. has been reorganized as the Burgess-Parr Co., Inc., with $120,000 capital, which will permit expansion of the calorimeter and special alloys production and provide for addition of several new lines. C. F. Burgess, president of the Burgess Battery Co. and the Burgess Laboratories, Madison, Wis., has acquired substantial interest in the company.

Association to Combat Brake Lining Resale

Turning Back Original Equipment Material for Retail Sale Creates Problem

NEW YORK, June 9—The Asbestos Brake Lining Association recently appointed a permanent ways and means committee to make specific recommendations for the solution of special problems affecting the industry One of the serious problems to be faced by this committee is that of resale of brake lining and clutch facing purchased by car manufacturers at equipment price for large volume production.

According to W. J. Parker, commissioner of the association, it has been found that many car manufacturers are purchasing special sizes of brake lining for original equipment and are turning some of this back into retail channels at prices which make competition peculiarly hard. Much of this material, being made on specific order, is found to be not suitable for other cars for which it is purchased in retail trade, and manufacturers are receiving complaints on material never intended for general market resale.

Considerable progress is being made by this association toward the introduction of a standardized cost accounting system.

Rupp Heads Wubco Co.

PITTSBURGH, June 11—Wubco Battery Corp. is the name of the organization that has taken over the Westinghouse Union Battery Co. The new company takes over the equipment, inventory, sales outlets, and good will. J. L. Rupp, a former executive of the old company will be president. The same quality Westinghouse batteries will be manufactured at the present plant at Swissvale, Penna.

Dealer Selling Truck With Body Built On Not Manufacturer, Rules Court of Claims

WASHINGTON, June 2—An automobile dealer who sold chassis and body parts of a truck separately at retail, billing the customer for the same in separate bills for the body and for the chassis was held not to be a manufacturer of automobiles by the U. S. Court of Claims, although the result of his work in each case was that the customer received a complete truck.

B. F. Hoffman, Inc., in August, 1923, received a notice and demand for $4,961 manufacturers' tax from the Internal Revenue Bureau. He paid under protest, was allowed somewhat more than $900 and appealed his case to the Court of Claims.

There he showed that he obtained his chassis complete from Ford Motor Co., at the list price less 20 per cent discount, with the manufacturers' tax added thereon. When a customer wanted a truck, the dealer would show the customer a catalog of the Lyter Body Co., and upon selection being made, Lyter company would bill the dealer at the list price minus 20 per cent discount, with the manufacturers' tax added. As an accommodation, the body company would attach bodies to chassis. Hoffman, Inc., would bill the customer separately for the chassis plus tax and for the body plus tax. The court held that he could not be considered a manufacturer, despite a previous case where a dealer combined bodies and chassis, buying each from different manufacturers and mounted the bodies on the chassis, selling the completed trucks at retail.

Men of the Industry and What They Are Doing

Studebaker Distributor Elected to Directorate

Henry R. Levy, president of the Studebaker Sales Co. of Chicago, has been elected to the directorate of the Studebaker Corp. of America. Studebaker's policy of giving its dealers positions of control in the corporation was inaugurated in 1925 when Paul G. Hoffman, then distributor for Los Angeles, was made vice-president in charge of sales and a director.

Mr. Levy's association with Studebaker extends back 20 years. In 1908 he joined the carriage department of the old Chicago branch as a retail salesman. In 1913 when the L. Markle Co. was organized to take over the branch, Mr. Levy became vice-president and general manager. Five years later, he purchased the distributorship and became president of the Studebaker Sales Co. of Chicago.

Mr. Levy's success as a distributor is indicated by the fact that the Studebaker Sales Co. of Chicago now has $3,000,000 invested capital and employs 500 people.

Aeronautical Board Named

The board of directors of Aeronautical Industries, Inc., has just been elected as follows: Professor Alexander Klemin of the Daniel Guggenheim School of Aeronautics of New York University; Samuel S. Bradley, general manager of the Aeronautical Chamber of Commerce, and Colonel Benjamin F. Castle, treasurer of the National Aeronautical Association.

Hoover Returns to Factory

Frederick A. Hoover, for several years manager of the Boston branch of the Chandler Motor Car Co. of New England, now discontinued, with the taking over of the Chandler line by the Jeffrey-Nichols Co., is going to Cleveland where he will be in charge of sales under Vice-President Sid Black looking after the six-cylinder line.

Dietrich Joins Franklin

Raymond H. Dietrich, famous coach designer and builder, has joined the custom body department of the H. H. Franklin Mfg. Co. in the capacity of consulting designer. Mr. Dietrich will take over the duties of the late Mr. deCausse. He will maintain his headquarters at the body building plant of Dietrich, Inc., in Detroit.

Lindbergh Gets Honorary Degree

Colonel Charles A. Lindbergh has been given a degree of Master of Aeronautics at New York University. The degree was to have been conferred with the regular commencement exercises but the honor was delayed on account of Colonel Lindbergh's inability to arrive at that time.

G. M. Export Honors Japanese Distributor

Japan's star automobile salesman, Y. Osawa, selling Chevrolet, Oakland, Pontiac and Vauxhall cars in Kioto, is spending two months in this country as a guest of General Motors Export Co. Mr. Osawa, a graduate of Princeton University, who is 26 years old, has during the last two years become one of the largest automobile distributors in the Far East by the application of modern American business methods. His trip to America is included in an award amounting to about 10,000 yen, which he won through the sale of 350 automobiles in a four-months' sales contest in the Orient.

Bloom Joins De Soto

Charles W. Bloom, veteran automobile merchandiser, has joined De Sota Motor Corp. division of the Chrysler Corp., as director of distribution. Previous to joining De Soto he was director of distribution for the Kelvinator Corp.

Mr. Bloom has been associated with the automobile industry for 20 years. He was assistant to the vice-president in charge of sales of Dodge Brothers and also was the Oakland factory representative in the Denver territory. His earlier days in the business were spent with Pierce-Arrow and with the Matheson Motor Co.

Meyer Autocar Manager

E. J. Meyer has been appointed manager of the Autocar branch in Cleveland, succeeding Frank H. Randel, resigned. Mr. Meyer has been connected with the Cleveland branch for some time. H. R. Butterfield was made dealer representative in Canton. Branches in Columbus and Cincinnati have been raised to full branch status instead of sub-stations under Cleveland.

Felton Succeeds Osborn

Appointment of Sam M. Felton, Jr., as manager of the Philadelphia district for the White Co. has been announced by Jay Rathbun, vice-president in charge of the company's Eastern Region. Mr. Felton, formerly division sales manager at Philadelphia, succeeds A. W. Osborn, who has resigned.

Gifford Heads Credit Men

Julian Gifford, secretary-treasurer of the Zenith-Detroit Corp., has been elected president of the Detroit Association of Credit Men.

Export Executives Meet Factory Men at Plants

J. D. Mooney, president General Motors Export Co., accompanied by a group of executives, visited General Motors plants in Detroit, Pontiac, Flint, Lansing and Oshawa, Can., to meet plant officials and discuss plans.

Accompanying Mr. Mooney on the trip were L. M. Rumely, vice-president and general manager of the export division of the General Motors Corp.; W. T. Whalen, vice-president and treasurer; F. K. Brun, assistant general supply manager; Harry Tipper, general sales manager; W. D. Sullivan, managing director; C. R. Osborn, general service manager; M. C. Hale, assistant to general manager; E. W. Smith, assistant to president; A. F. Bassett, managing director, General Motors of Brazil; F. N. Adgate, manager Detroit office; E. K. Wild, assistant general service manager; A. C. Connellee, assistant general manufacturing manager; H. S. Broom, chairman, Delco-Remy & Hyatt, Ltd., of London; C. R. Evans, assistant to the president of the General Motors Export Co. in London; R. R. Thien, advertising manager; A. L. Cooper, consulting artist, and H. R. Audet, head of color section.

J. W. Patten has been appointed assistant treasurer of G. m. b. H., Berlin. N. C. Tuxbury has returned to New York after a several months' visit to the west coast of Africa. E. E. Kaiser, formerly manager of General Motors Peninsular, has returned to the United States on a vacation trip, as has C. C. Williams, manager of the Brisbane branch of General Motors Australia, Ltd.

Named to Motor Service Posts

Overseas Motor Service Corp. has appointed Fred Barnhouse representative in New Zealand, and W. J. Meyer, representative in Mexico. C. R. Osburn, vice-president and general manager, has returned to New York after a six months' trip to Europe and South America, and Howard Barnhouse, representative in Brazil, is in New York on a visit to the factories.

Letts Here on Visit

Sir William Letts, managing director of Willys-Overland-Crossley, has arrived on the Mauretania. He will spend some time at the Willys-Overland plant at Toledo, working out for fall and winter sales in Great Britain and on the continent.

Willys on Railroad Committee

John N. Willys has been elected to the executive committee of the Wabash Railroad Co. He succeeds the late Albert W. Krech to this post.

German Plants Fear Further Duty Cuts

Cooperative Campaign to Promote Domestic Sales Finds Funds Inadequate

BERLIN, May 23 (*by mail*)—The Association of German Car Makers, which also includes kindred industries, recently held its twenty-seventh annual assembly and report was given of last year's development. The past year has been devoted to internal development of the various departments and to an attempt at carrying through a nation-wide advertising campaign for German-made cars. This campaign was worked on a cooperative basis, independent of the individual advertising of each maker. It suffered, however, from lack of funds. The outlook is not being regarded as very promising, especially as the import duties will again be decreased from July 1 onwards.

The work of the technical division of the association has proved valuable to the members in that it has been conducive to the improvement of production methods. A special sub-department watches technical development abroad and immediately informs the members of all important occurrences. The statistical department has been greatly improved and the general efficiency of the association has been remarkably raised.

For the fourth year in succession the general secretary of the association has published, in conjunction with Doctor Ernst Valentin Verlag, a year book giving a detailed account of the work of the association, general technical development in Germany and of market conditions as seen by the German makers.

Observe Graham Debut

DETROIT, June 11—Graham-Paige dealers this week are celebrating the first anniversary of the entrance of the three Graham brothers into the passenger car field. It was on June 10, 1927, that the Grahams acquired ownership control of the Paige-Detroit Motor Car Co. On Jan. 7 this year they presented the first passenger car to bear their name and the company became the Graham-Paige Motors Corp.

Butler Takes Graham-Paige

DETROIT, June 9—Announcement was made today that the Butler Motor Co., of Kansas City, has been made Graham-Paige distributor for that territory. The company is headed by John A. Butler, president. In acquiring the Graham-Paige franchise, the Butler company has arranged to purchase Bird-Sykes-Bunker Co.

Cleveland Asks Tax Refund

CLEVELAND, June 11—The Cleveland Automobile Co. has filed suit in Federal Court seeking judgment against the government for $382,595. This represents what the company claims was paid in excess of its proper income tax for the year of 1920. The government, the petition says, estimated the company's profit for 1920 at $1,462,000 and levied taxes at that amount. The company records show profits of only $1,037,000, the petition says. The company is now a part of the Chandler-Cleveland Co.

Chrysler and Stutz Seek Whitworth Cup

PARIS, June 1 (*by mail*) — Four Chryslers and a Stutz will represent the United States in the 24-hour road race for the Rudge Whitworth Cup, to be run at Le Mans on June 16 and 17, in which 44 cars have been entered. The Chryslers have been entered by the French distributor, Christian Lie, independently of the factory, although the race has an essentially international character and has an important bearing on sales in foreign countries. The Stutz has been entered by the French sportsman, M. Brisson, who has secured as his teammate, M. Bloch, one of the drivers of the Hispano-Suiza in the recent match at Indianapolis. Gil Anderson, who is at present in France on his honeymoon, has consented to prepare the Stutz for Brisson.

Although theoretically intended for stock cars, the rules of the Rudge Whitworth 24-hour race allow various changes being made in the chassis. The Chryslers have the Red Head engine, but as Ethyl gas cannot be used in this race the compression has been slightly lowered. The vacuum tank has been replaced by an electric pulsometer and two Solex carburetors have been fitted, and there is a supplementary oil tank under the cowl.

The keenest competition is expected to come from a team of three Bentleys of rather bigger piston displacement than the Chryslers, and from two Aries cars. France, America, England and Italy are represented in the race.

Urges Exhaust in Car Top

NEW YORK, June 12—Redesign of car bodies so that exhaust gases will be discharged from the top, in order to lessen danger to life due to the presence of carbon monoxide in the air, has been advocated by Dr. Louis I. Harris, health commissioner of New York.

"This should appeal to every long-visioned automobile manufacturer," said Dr. Harris, "as a very necessary improvement, so as to obviate future public action that may of necessity be very drastic."

Willys Arranges Service

WICHITA, KAN., June 11—Watkins Rebabbitting Service has been designated by Willys-Overland Co. as rebabbitters for all cars produced by the company. Watkins will give service on connecting rod bearings through its branches on an exchange basis.

Financial Notes

Stromberg Carburetor Co. reports net income for the first quarter of the current year as $109,721. This is equivalent to $1.37 a share and compares with $22,520, or 20 cents a share, earned in the previous quarter and with $44,665, or 56 cents a share, in the third quarter of 1927. Quarterly dividend of 50 cents, payable July 2 to stockholders of record June 18, has been declared.

Willys-Overland Co. directors deferred action on resumption of dividends on common stock till June 21 when an adjourned meeting will be held. Regular $1.75 quarterly dividend on preferred stock was declared payable July 22 to holders of record June 25. Peak production continues at plant and employment is at highest point in Toledo history.

Lakey Foundry & Machine Co. has declared a stock dividend of 20 per cent, payable to stock of record June 25. With the payment of this dividend Lakey stockholders in 1928 will have received 120 per cent in stock dividends and $1.60 per share in cash.

Sparks-Withington Co. has declared a 10 per cent stock dividend and a cash dividend of 75 cents a share on common stock against the 25 cents a share formerly paid.

Auburn Automobile Co. has declared quarterly dividend of $1 and a stock dividend of two per cent both payable July 2 to holders of record June 21.

Vauxhall Motors, Ltd., reports deficit of £12,017. This compares with a surplus in 1926 of £22,618.

South Africa Increasing Demand for Closed Cars

WASHINGTON, June 13—The Department of Commerce is advised that motor sales in the Union of South Africa are active with increasing demand for closed models. Official registrations for 1927 totaled 139,393 vehicles, distributed as follows: passenger cars, 98,246; motorcycles, 32,250; trucks, 8136 and buses 761.

The department is also advised that the Minister of Finance for the Union has indicated his intention of proposing among a number of decreases in tariff rates to become effective on approval by Parliament, reductions in tariff affecting motor car chassis for bodies or motor trucks built in the Union, track chains, parts for traction engines and tractors.

I.H.C. Builds New Model

CHICAGO, June 13—International Harvester Co. has brought out a new 1-ton truck with a two-speed rear axle which, in combination with the three-speed transmission mounted with the engine in a unit powerplant, gives six forward speeds and two reverse. The engine is a four-cylinder 3½ x 4½ in., the wheelbbase is 124 in., and pneumatic tires are regular equipment.

California Proposes New Insurance Plan

Would Compensate Sufferers in Accidents—Sees Elimination of Junk Cars

SACRAMENTO, CAL., June 9—A law which, while not dealing directly with the subject, may result in the elimination of "junk cars" from the highways of California, is being prepared by Frank G. Snook, chief of the state division of motor vehicles, and Louis La Place, head of the statistics department of that division. The measure will be presented to the next session of the state legislature, and has the support of a considerable number of the members from all sections of the state.

The new law is intended primarily to compel all automobile owners to carry compensation insurance, so that the sufferer in an automobile accident will be completely protected, not alone as to damage done his car, incidental hospital bills and physicians' fees, but also as to salary or wages during such time as he may be prevented from attending to his work due to results of the accident. It is quite generally believed that this sort of insurance will work out better than compulsory liability insurance. The plan would require all motorists to take out this compensation insurance before a license for the operation or registration of a motor vehicle would be issued.

Under the new bill, the applicant for either type of license would be required to produce a certificate from some reliable and authorized compensation insurance company. In short, the idea is the same as that which protects workers under the industrial accident commission plan which has been completely successful in this state. "Its adoption," said Mr. La Place, "would mean that persons injured in accidents, and their families, would be fully protected while the injured one, or ones, recover from their injuries. Compensation would start immediately, whereas, under the liability plan, in many cases great hardship is endured before payment is made. I believe it can be worked out so that the rate charged for this insurance will be extremely low. Beyond this, many old and unsafe automobiles now cumbering the highways, would be eliminated, because compensation insurance companies would refuse to accept as risks owners of such cars."

Upholds Elkon Patent

NEW YORK, June 9—Elkon Works, Inc., has been upheld in Federal Districts Court here in its suit against the Welworth Automotive Corp. for infringement of patent No. 1,089,907, which relates to electrical contacts, particularly for rheotomes or other vibratory circuit making-and-breaking devices, ordinarily used as sparking or ignition contacts.

Advertising Stress on Speed Protested

CLEVELAND, June 13—A resolution protesting against the stressing of speed in automobile advertising was passed at a recent meeting here of the Eastern Conference of Motor Vehicle Administrators. The resolution, in part, follows:

"Be it resolved: That the Eastern Conference of Motor Vehicle Administrators go on record by formal vote as decrying the over-emphasis being placed on speed in the advertising by the manufacturers, and urge that other points of merit of the cars be stressed, and

"Be it further resolved: That each member State's representative in the conference, upon return to his respective jurisdiction, give publicity locally to this action by the conference."

Standardization Progress Outlined in Year Book

NEW YORK, June 9—Advances in the standardization activities of numerous American industries are reported in the Year Book of the American Engineering Standards Committee issued today.

Of direct application to the automotive industry are the Safety Code for Aeronautics, which has been issued; Safety Code for Automobile Headlighting, which is under revision; Safety Code for Colors for Traffic Signals, which has been approved by the committee and is in press; Safety Code for Automobile Brakes and Brake Testing, which has been issued, and Code of Street Traffic Signs, Signals and Markings on which standardization is now under way.

Other work done by the committee includes standardization in mechanical, electrical and civil engineering, in metallurgy and in the field of the chemical, textile and mining industries.

Aircraft Materials Manual

WASHINGTON, June 9—A manual of interest to the airplane manufacturer, known as the Manual for the Inspection of Aircraft Wood and Glue for the U. S. Navy, has been compiled by the Navy Department, copies of which may be had by writing to the Superintendent of Documents, Government Printing Office, Washington.

Larrabee-Deyo Export Office

BINGHAMTON, N. Y., June 11—The Larrabee-Deyo Motor Truck Co. has opened an export office in New York. The company has arranged for this office to make a close study of problems met by Larrabee dealers abroad.

Ohio Dealers Oppose Further Car Taxes

Hold Income From Present Taxes and Fees Sufficient for Road Needs

COLUMBUS, OHIO, June 9—Unqualified opposition to any increase in either the gasoline taxes or registration fees in Ohio was registered by the board of governors of the Ohio Council, National Automobile Dealers Association, at a called meeting held here this week. J. W. Tarbill of Cincinnati, chairman of the board, declared: "Information has come to us that certain Ohio interests are already contemplating the possibility of increasing the cost of operation to motorists of Ohio. Ohio now has a 3-cent gasoline tax which is yielding approximately $20,000,000 a year and is deriving an additional $10,000,000 from registration fees. We believe that $30,000,000 is not only ample to care for highway needs, but is as much as can be spent effectively and honestly. We view with suspicion the effort to increase this fund above either needs or efficient methods of spending."

The board also approved a certificate of title law to reduce automobile thefts. According to statistics compiled by the council, thefts have been materially reduced in the 25 states having such a law. Since Ohio motorists pay an abnormally high penalty in excesive theft insurance premiums, it is believed that the passage of the title law would materially reduce insurance rates.

Chairman Tarbill declared that the present Ohio bill of sale law is an outworn make-shift. It was enacted in 1921 and amended in 1923 and 1925 but is still unworkable in many ways. It affords little or no protection to either the buyer of an automobile, the seller, the finance company or the bank that carries automobile time paper. A determined effort will be made by dealers to bring about a change in the law into conformity with the common practices of the most progressive states.

C. A. Vane, general manager; A. C. Faeh, assistant general manager, and W. B. Spalding, general counsel, of the National Automobile Dealers Association, attended the meeting and outlined policies of the National organization. Gaylord R. Ford, acting manager of the Ohio Council, presented statistics showing the growth of the Ohio council which now represents 3000 automobile dealers in Ohio.

Estonia Doubles Imports

WASHINGTON, June 9 — Estonia more than doubled its automobile imports during 1927 over 1926, approximately 400 cars being imported last year as against 197 during 1926. According to a report to the Department of Commerce, 279 automobiles or 70 per cent of the total imports of this class, were shipped from the United States.

G.M. Shows Gains in Missouri Sales

Scores More Than Half of Registrations in First Four Months Period

KANSAS CITY, June 9—Motor car registration figures for April, just compiled, reveal that General Motors divisions for the first four months this year sold more than one-half of all the passenger cars registered in Missouri. The figures also reveal that, while the total number of registrations for the period show a decrease of 8233 cars, cars manufactured by General Motors had a gain of 2790, the comparison being with the same period of 1927. Important gains were scored also by other makers.

General Motors sales for April, as shown by the registration figures, were 4640 cars out of a total of 9039 for all makes in the state. For the four months period the figure was 18,158 with the total for all makes being 34,515. The comparative figure for 1917 is 15,368 General Motors cars sold in the first four months of the year out of a total of 42,748.

In making a comparison of sales for the four months period against the same period of 1927, the entire loss in sales for the state is traced to the drop in Ford cars. While several other makes in the light car class made gains, the total was not enough to make up for the Ford loss. In the four-month period of 1927 the Ford registration on new cars was 14,660, while the figure this year is only 2167. Chevrolet made a slight gain this year with 12,505 for the period against 12,384. Whippet registration jumped from 1201 in 1927 to 2238 for this year, with the April Whippet registration going to 740. The Essex gain was about 25 per cent, the figures being 1593 in 1927 and 2098 this year. Pontiac had more than a 50 per cent increase, jumping from 964 to 2113.

Cleveland Used Car Sales Gain

CLEVELAND, June 9—Sales of 14,927 used cars here in May broke all records, Herbert Buckman, secretary-manager of the Cleveland Automobile Manufacturers & Dealers Association, reported. This exceeds by 500 the best previous May sale, established in 1926. A steady gain in new car sales was shown, 4871 being delivered in May, 1928, compared with 4548 in May, 1927. Comparisons for the first five months follow:

	1928	1927
New Cars.....	16,530	14,058
Used Cars	55,443	54,360

Denver Ford Plant Starts

DENVER, June 9—The Denver branch of Ford Motor Co. opened this week with 290 employees, and a weekly production of 150 cars. It is hoped to reach the maximum capacity within three weeks.

Opening New Areas Aids Australian Sales

WASHINGTON, June 9—Automobiles are being depended on for necessary transportation with the constant opening of new areas for agricultural development in western Australia, according to a report from Charles F. Baldwin, assistant trade commissioner at Sydney to the Department of Commerce.

The country, he says, is primarily a market for the low and medium priced passenger car and the light truck, especially in the western section. The open car predominates at the present time and is expected to continue so to do in the future because of the favorable climate. Trade is seasonal, dependent upon purchasing power from wool and wheat production.

Louisville Car Sales Increase 25% in May

LOUISVILLE, June 9—Automobile sales in Louisville for May represented the largest month's sales of automobiles in Louisville since 1924. Sales in May were 25 per cent larger than for May last year and 12 per cent greater than in April of this year. Sales for the year to date are 18½ per cent greater than for the first five months of 1927. Total sales of new cars for May were 1034, as against 807 in May, 1927, and 903 cars in April this year.

In addition to car sales there were 91 trucks sold, making a grand total of 1125 automobiles for the month.

Car sales were as follows: Auburn, 2; Buick, 44; Cadillac, 9; Chandler, 4; Chevrolet, 378; Chrysler, 48; Dodge, 41; Durant, 25; Erskine, 12; Essex, 63; Ford, 88; Franklin, 2; Gardner, 1; Graham-Paige, 55; Hudson, 12; Hupmobile, 10; La Salle, 9; Lincoln, 8; Marmon, 5; Nash, 12; Oakland, 16; Oldsmobile, 25; Whippet, 47; Packard, 15; Pierce-Arrow, 1; Pontiac, 44; Reo, 16; Wolverine, 1; Studebaker, 23; Willys-Knight, 19.

North Carolina Sales Gain

RALEIGH, N. C., June 9—During the month of May 5510 automobiles were sold in the state, according to figures compiled by the state automobile bureau. This brings the total for the year to 23,037, which is nearly 2000 more than the number sold to June 1, last year. Car sales for the past month were slightly under the April sales of 5640, but were 1300 more than for the corresponding month of last year.

Car sales started off slowly this year and until April were less than for the corresponding period of last year.

Nash to Introduce New Line of Cars

Plants Made Ready for Production Within Few Weeks —Has New Engine

CHICAGO, June 9—What is said to to be an entirely new type of automobile will be introduced within a few weeks by the Nash Motors Co., it was learned today.

For some months experimental departments and test divisions have been operating behind barred doors. Much new equipment has been placed in the various plant sections and it is understood that almost the entire production system has been reequipped.

The new cars are now said to have completed final tests but details of the new engine have been guarded with particular secrecy. It is admitted that the new engine is a radical departure from conventional design.

Bodies for the entire line are said to be new in design and treatment and though thoroughly American in principle, the design is said to include European touches, adapted to meet the conditions of modern traffic as well as high speed country arteries.

Used Car Sales Improved in Many Leading Cities

DETROIT, June 9—Improved conditions in the used car market are evidenced by the delivery of approximately 5718 used cars by the Dodge Brothers dealer organization in the United States last week, according to W. F. Hufstader, director of used car sales. A turn-over of used car stock is being maintained once every five and one-half weeks by the company's dealers.

The used car situation over the country is showing great improvement, according to Mr. Hufstader. Since the first of April there has been a decided movement of cars from the hands of dealers. Used car sales are reported "heavy" from the New York, San Francisco and Boston districts. Sharp upward trends have been noted in Indianapolis, Denver, Milwaukee, Minneapolis, Washington and Des Moines, while improvement continues in Kansas City, Memphis, Seattle, Dallas and Detroit.

Studebaker Sales Gain 34.5%

SOUTH BEND, June 11—Retail deliveries of Studebaker and Erskine cars throughout the world during May exceeded deliveries for the same period last year by 34.5 per cent according to a statement by the Studebaker Corp. of America. May was the ninth consecutive month that Studebaker deliveries have shown an increase over the corresponding month of the previous year. In the United States, May deliveries to customers were the largest in five years, and the last 10 days of the month the largest of any corresponding period in company history.

Industry Continues Large Steel Buyer

Many Factories Taking Heavy Tonnages Though Others Reduce Shipments

NEW YORK, June 14—While shipments of sheets and strip steel to automotive consumers continue in good volume, every day now sees mills cleaning up more and more of their specifications, without very much in the way of new business being added to the backlog. The leading interest's unfilled tonnage statement, issued last Saturday, shows that the steel industry as a whole is back where it was last October. The decrease of 455,311 tons from the 3,872,133 tons which the corporation had on its books on April 30, was somewhat larger than the trade had looked for.

Full-finished automobile sheets, which for many months led all other descriptions in urgency of the demand, are now showing moderate recession, shipments to some motor car manufacturers having diminished sharply while others continue to call for good-sized tonnages. The market for hot-rolled steel bars continues at 1.85 cents, Pittsburgh, the new 1.90 cent third quarter quotation having so far failed to bring out any representative business. It is hinted in some quarters that some time in the course of the next few weeks the mills will make known 1.95 cents as the small lot price to quicken contracting at 1.90 cents.

Hot-rolled strip sellers deny reports of concessions under the minimum of 1.75 cents, Pittsburgh, for 6-in. and wider material. The cold-finished steel bar market is firm at 2.20 cents, Pittsburgh and 2.25 cents, Cleveland, hand-to-mouth buying predominating. Automotive alloy steels show no change in price. Bolts and nuts move in small tonnages at unchanged price levels.

Pig Iron—While prices for steel-making iron in the Mahoning Valley have given way to some extent, foundry and malleable being sympathetically affected, Michigan and Ohio foundries face somewhat higher price views. Cleveland, Chicago, and Buffalo furnaces are eagerly competing for the business of Middle West automotive foundries which are proceeding slowly in making third quarter commitments. The Michigan price is unaltered at $17.50 and $18.00.

Aluminum—Developments in the last few days cause consumers to wonder what the immediate future will bring in the way of aluminum price changes. European producers have put into effect a reduction of about 2 cents per pound, and the London quotation is now the equivalent of about 21 cents for 98 per cent metal.

Copper—The market is marking time. Satisfied with the metal's recent price advances, producers are not unduly pushing sales.

Tin—Bargain prices for tin appear to attract dealers and semi-speculative interests far more than consumers. London beests far more than consumers.

Lead—Consuming demand continues fair, with storage battery manufacturers consistent buyers.

Uncolored Bottles Recommended for Oil

WASHINGTON, June 9—Clear, uncolored glass was recommended for bottles for sale of lubricating oil in specifications submitted to the Twenty-First National Conference on Weights and Measures here recently. Specifications suggested included a maximum height of 12¾ inches for 2-quart capacity bottles; 10½ inches for 1 quart sizes and 8¼ inches for 1 pint sizes. Each bottle, it was suggested, should have its capacity clearly blown or otherwise clearly and permanently marked on its side.

New Stewart 3-Ton Model Offered in 5 Wheelbases

BUFFALO, June 9—Announcement of a new heavy duty four-speed 3-ton truck, powered by a six-cylinder 3⅞ x 5-in. engine and equipped with four-wheel brakes, has just been made by the Stewart Motor Corp. of Buffalo. Price is $3,490. This model is offered in five wheelbases: 147 in. and 165 in., which are the two standard lengths, and optional lengths of 176, 190 and 220 in.

The truck is designed to afford high road speeds at low engine speeds and at the same time offering great power at lower speeds. The engine is a special bus type, developing 75 hp. with removable head and removable block.

Indiana Adds Two-Tonner With Tors-Elim Mounting

WABASH, IND., June 9—A new two-ton, six-cylinder chassis, known as the Admiral Model 400, has been added to the line of the Indiana Truck Corp. This new unit has mechanical four-wheel brakes, four-speed transmission and incorporates the Tors-Elim three-point mounting of engine and radiator, hood, cowl and cab. This suspension mounting is designed to free these units from torsional strain and vibration to which the chassis is subjected. Standard equipment includes moto meter, bumper, electric starting and lighting equipment including lights and horn, air-cleaner, oil filtrator, speedometer and tire carrier.

Olds Nears 1927 Total

DETROIT, June 9—The Olds Motor Works stands to equal its total 1927 production by July, this year, according to D. S. Eddins, vice-president in charge of sales. May shipments totaled 11,716 Oldsmobiles, a gain of 223 per cent over May last year. Shipments for the first five months of this year have totaled 38,728 and schedules call for 12,000 in June which would bring shipments for the first six months of the year to within 7029 of the total shipments for 1927.

Rim Output in May Continues 1928 Gain

Total for First Five Months Exceeds 1927 Period by More Than Million

CLEVELAND, June 11—May showed a slight increase over May last year in the production of automobile rims as reported in the monthly bulletin of the Tire & Rim Association of America. Total for May this year was 2,185,592 as opposed to 2,169,208 in May, 1927. The total for the five month period is still about 1,000,000 above the 1927 totals, however, the figures being 10,544,586 for 1928, and 9,543,318 for 1927.

Production of leading sizes follow:

Clinchers	May, 1928	May, 1927
30 x 3½	38,191	69,685
18-in. Balloons		
18 x 4	139,337	92,657
19-in. Balloons		
19 x 3½	222,845	117,356
19 x 4	217,348	246,346
19 x 4½	93,193	45,111
20-in. Balloons		
20 x 3½	48,503	16,914
20 x 4	258,847	169,738
20 x 4½	23,577	37,735
20 x 5	48,307	39,894
21-in. Balloons		
21 x 3½	66,013	763,898
21 x 2.75	556,611	.....
21 x 4	57,779	244,906
21 x 4½	36,168	87,607
20-in. Truck		
30 x 5	185,023	126,661
32 x 6	50,735	20,176
34 x 7	14,171	4,794

Hercules Division Builds 200 Truck Bodies Daily

EVANSVILLE, IND., June 9—Many marked changes in the treatment of commercial car bodies will be noted this year through the favoring of gayer colors as in the passenger car body, according to Fred P. Nehrbas, general manager Hercules products division plant of Servel, Inc.

With an average daily production of 200 bodies a day entailing the use of every available foot of floor area, the Servel body building industry has entered upon the busiest period of its career with little likelihood of any change in volume production for at least four months Mr. Nehrbas declared.

P-A Truck Sales Increase

BUFFALO, June 9—Sales of Pierce-Arrow commercial cars show a healthy and most satisfactory increase, according to Hal T. Boulden, manager of the commercial car division of the Pierce-Arrow Motor Car Co. "April sales were fine," said Mr. Boulden, "but were increased in May. The two new models announced in the past six months have been exceptionally well received."

Air Board to Study Accident Prevention

Department of Commerce Aims to Promote Confidence in Aviation

WASHINGTON, June 14—Centering attention on the specific causes of airplane accidents, with particular attention as to whether fault lies with personnel or equipment, an accident investigation board of the aeronautics branch of the Department of Commerce shortly will inaugurate a prevention program which, it is hoped, will greatly reduce mishaps in the air and promote public confidence in aviation.

Aeronautics Director C. M. Young has named the following as members of the new board: E. P. Howard, regulations division, president; G. G. Budwig, chief of inspection; Dr. L. H. Bauer, medical director; C. L. Ofenstein, engineer, and E. McD. Kintz, legal counsel.

Should the study of certain accidents disclose that the fault lies in the personnel, prevention of future accidents may be brought about by more stringent piloting regulations, Mr. Young thinks.

On the other hand, should it be noticed that certain planes, of a certain type, or from a certain manufacturer are involved in frequent mishaps and the analyses of the accidents show a defect in the structure of the craft, the manufacturer will be advised as to the result of the findings. He will then be in a position to apply suitable remedies.

Seeks Commercial Plane Test

NEW YORK, June 9—The Commerical Airplane Manufacturers Section of the Aeronautical Chamber of Commerce of America, Inc., has appointed a committee to work with the aeronautics branches of universities and with others interested in the formulation and acceptance of a standard performance test for commercial planes.

The members of this committee are: Walter Beech, of Travel Air Mfg. Co.; A. J. Edwards, of Prudden-San Diego Airplane Co. and C. S. Jones of Curtiss Flying Service. Cooperating with this committee will be Clarence M. Young, director of aeronautics of the Department of Commerce; Dr. H. Bateman, of the California Institute of Technology; Professor E. P. Lesley, of Stanford University; Professor F. W. Pawlowski, of the University of Michigan; Professor Alexander Klemin, of the Daniel Guggenheim School of Aeronautics, and some representative of the Massachusetts Institute of Technology.

Oakland Entertains R. R. Men

PONTIAC, June 9—Claim agents representing a majority of the railroads of the United States were guests of the Oakland Motor Car Co. this week. After inspecting the plants they visited the proving grounds.

Thompson Air Line to Cover Michigan

CLEVELAND, June 9—Thompson Aeronautical Corp. will operate an air mail and passenger line from Detroit to Chicago beginning about July 15. The company will fly over 534 miles of airway with terminals in Pontiac, Bay City, Muskegon and Chicago. Other cities touched by the service will be Detroit, Ann Arbor, Jackson, Battle Creek, Saginaw, Flint, Lansing, Grand Rapids and South Bend. The company will operate two open cockpit and four Stinson-Detroiter cabin planes. E. G. Thompson, vice-president of Thompson Products, Inc., organized and heads the aeronautical company, with W. E. Close, treasurer, and W. M. Albaugh, secretary.

Air Mail Volume Gains on All Routes During May

WASHINGTON, June 13—The steady increase in business on the 19 contract air mail routes throughout the country continued during May when a total of 199,234 lb. of mail were carried by planes, the Postoffice Department announces. This figure was 28,256 lb. in excess of the amount of mail carried by the planes on the same routes during April.

The Chicago-San Francisco route was the heaviest in point of traffic, carrying 56,654 lb. during the period mentioned with the New York-Chicago route a close second accounting for 53,012 lb. These two routes accounted for more than half the air mail handled. The Salt Lake City-Los Angeles route with 21,747 lb. and the Chicago-Kansas City-Dallas night and day route with 13,448 lb. were next in order of prominence.

Broadens Welding Award

NEW YORK, June 11—The American Welding Society has announced that the board of trustees of the Samuel Wylie Miller Medal, having had no paper of sufficient merit submitted to justify the award during 1927, has revised the conditions under which the medal may be awarded. The conditions have been made very broad so that it may be granted annually for any achievement that contributes conspicuously to the advancement of the welding art.

Takes Over Waller Company

WATERLOO, IOWA, June 11—National Auto Appliance Co. has been organized to continue the manufacture and marketing of the products of the Waller Mfg. Co. The company plans the addition of several new automotive products.

Boeing Sport Plane Offered at $7,500

Plane is Designed for Landing and Taking Off on Limited Sized Fields

SAN FRANCISCO, June 9—Boeing Airplane Co. of Seattle announces development of a new sport biplane, to sell with all equipment, at $7,500. The ship is equipped with a Fairchild-Caminez engine of 125 hp., driving it at 125 m.p.h. This powering is done, the announcement says, with a view to making possible landings and takings off on and from small fields. Lower prices are promised when quantity production is reached.

The Boeing company also has developed two flying boat types, which will be on the market soon. The force of workmen at the plant was increased from 700 to 900 during May, in an effort to catch up with orders on hand. An assembling plant is to be established in San Francisco, and another in Los Angeles soon. W. E. Boeing, president of the corporation, is building his own private air yacht, a 12-passenger cabin plane, which is to take the air about the end of June.

French Commercial Planes Increase Mileage in '27

WASHINGTON, June 9—Airplanes on six French commercial aviation lines flew more than 6,000,000 kilometers during 1927, an increase of almost 16 per cent over the 1926 total, H. C. Schuette, trade commissioner at Paris, has reported to the Department of Commerce.

The report classifies, in order of distance flown, the six companies operating the lines as follows: Compagnie Generale Aeropostale, Compagnie Internationale de Navigation Aerienne, Compagnie Air Union, Society General de Transport Aerien, Compagnie France-Algerie and Compagnie Air Union (Lignes d'Orient). The Air Union Co., however, operating a London-Paris-Marseilles line with connections, held first rank as regards traffic handled with a figure of 3,195,000 passenger kilometers.

Wise Chrome in New Plant

DETROIT, June 9—The Wise Chrome Products Co. is now operating in its new plant at 2480 Bellevue Ave. The factory is designed to specialize primarily in chromium plating and is also equipped for nickel, copper, cadmium and barrel plating. The organization back of the new company has had from five to ten years experience in the electro plating field. Maxwell M. Wise, formerly president and general manager of The Wise Industries, is president and general manager. He has appointed the following personnel: Robert L. Reed, sales manager; Herbert J. Pagel, production manager, and Jay H. Monaweck, chemical engineer.

Dodge Contest Draws 340,000 Competitors

DETROIT, June 9—Prize winners in the Victory Six slogan contest staged by Dodge Brothers, Inc., have been announced. There were 340,000 slogans submitted from all over the country and checks aggregating $20,000 have been mailed to the 354 prize winners. Every person entering the contest had to ride in a Victory Six to qualify.

C. C. Michael, 26, of Colorado Springs, Col., won first prize of $1,000 with his slogan "Making a Good Name Better." F. R. Shoemaker, of Erie, Pa., won second prize of $500 with his slogan "Try to Get by Without One." Mrs. W. R. Price, of Carson, Wash., with her slogan of "A Phenomenal Car at a Nominal Cost," and Miss Florence List, of Bay City, Mich., with her slogan of "Unrivaled in Construction, Unequaled in Beauty" tied for third and received $250 each. Twenty additional contestants shared fourth place, winning $100 each. There were 30 fifth places to receive awards of $50 each; 100 sixth place winners of $25 each and 200 seventh place winners of $10 each.

The contest was held throughout March. Judges were E. G. Wilmer, president of Dodge Brothers; John R. Lee, sales manager, and H. J. New and W. M. Purves, assistant sales managers.

Czecho Sales Increase

WASHINGTON, June 9—Dispatches to the Department of Commerce from Prague, Czechoslovakia, report an average of 18 new automobile licenses being issued daily. This rate is higher than in any previous year and indicates that 1928 sales will be record-breaking. There were 10,781 motor vehicles registered Dec. 31, 1927, as compared with 6640 at the close of 1925 and 7879 at the end of 1926.

Coming Feature Issues of Chilton Class Journal Publications

June 23—Engineering Issue—Automotive Industries

Oct. 10—Marketing Annual for 1929—Motor World Wholesale.

Chevrolet Calls Dealers to Get Advertising Views

DETROIT, June 9—Chevrolet has renewed its plan of advertising conferences in which the automobile dealer is given a voice in the national advertising program of the factory, according to John E. Grimm, Jr., advertising manager. From time to time dealers selected from the domestic organization will meet with factory sales executives to discuss the publicity plans of the company for the next few months. The purpose of these conferences says Mr. Grimm is to keep the home office constantly in touch with problems, faced daily by the dealers so that Chevrolet advertising may be guided by actual field conditions and thus prove most effective.

In selecting dealers to attend the conferences both large and small contract holders will be brought in to obtain a true cross-section picture. Meetings will be held monthly each being attended by dealers from a certain section of the country. Sessions last two days the first is devoted to a discussion of advertising and the second given over to a visit to the proving grounds.

Peerless Forms N.Y. Branch

CLEVELAND, June 11 — Peerless Motor Car Corp. has established an eastern distributing branch in New York. C. M. Zimmerman will be branch manager. The branch will speed up service to dealers.

National Aero Shows 4-Cylinder Engine

NEW YORK, June 9—The National Aero Corp. has developed a four-cylinder straight line 60 hp. air-cooled engine, similar in principle to the seven-cylinder radial engine described in the March 3 issue of Automotive Industries.

This engine, which is designed by E. S. Cameron, is developed to meet the need for a light engine of less than 100 hp. and is capable of developing 60 hp. at 1800 r.p.m. Cylinders for this engine are duplicates of the cylinders used in the Aero radial engine and, consequently, embrace the same cooling and operating features.

Two sets of intake and exhaust valves are provided for each cylinder and these are opposed in the cylinder head so that the incoming mixture fans the heated exhaust valves, thus doing much to prevent premature firing or detonation. The valve operating mechanism is the same as that described for the radial engine.

This engine, with a bore of 4.125 in. and stroke of 4.75 in. has a displacement of 254 cu. in. and a compression ratio of 5.4 to 1 with ordinary gas, or 6 to 1 with special aviation gas. The dry weight is 180 lb., over-all length with starting motor 39.125 in. height 27.75 in. and width 14 in.

Burdett Companies Merged

CHICAGO, June 9—Consolidation of six companies engaged in the manufacture of oxygen, hydrogen and acetylene has been effected by the organization of the Compressed Industrial Gases, Inc. This company is a Delaware corporation with an authorized capital stock of 250,000 shares of no par value. The companies consolidating are the Burdett Oxygen & Hydrogen companies of Pittsburgh, Chicago, Detroit, Texas, Chattanooga and Oklahoma. Distribution is not affected.

Calendar of Coming Events

SHOWS

American Electric Railway Ass'n, Public Auditorium, Cleveland..Sept. 22-28
American Road Builders Association, Inc., Cleveland Auditorium..Jan. 14-19
American Society for Steel Treating, Commercial Museum, Philadelphia .....Oct. 8-13
Automotive Equipment Association, Coliseum, Chicago .....Oct. 22-27
Berlin .....Nov. 8-18
Brussels .....Dec. 8-19
*Chicago .....Jan. 26-Feb. 2
International Aeronautical Exposition, Grand Palais, Paris....June 29-July 15
Leipzig .....Aug. 26-Sept. 1
London, passenger cars .....Oct. 11-20
National Standard Parts Association, Cleveland Auditorium...Oct. 29-Nov. 3
*New York, Grand Central Palace..Jan. 5-12
Paris, passenger cars .....Oct. 4-14
Paris, trucks .....Nov. 15-25
Prague .....Sept. 1-9
Salon, Automobile Salon, Inc., Hotel Drake, Chicago .....Jan. 26-Feb. 2
Salon, Automobile Salon, Inc., Hotel Biltmore, Los Angeles.....Feb. 9-16
Salon, Automobile Salon, Inc., Hotel Commodore, New York .....Dec. 2-8
Salon, Automobile Salon, Inc., Palace Hotel, San Francisco...Feb. 23-Mar. 2

*** Will have special shop equipment exhibit.**

CONVENTIONS

American Automobile Association, Bus Division Meeting, Cincinnati, June 27-28
American Automobile Association, Annual Meeting, Cincinnati....June 28-29
American Electric Railway Ass'n, Public Auditorium, Cleveland...Sept. 22-28
American Gear Manufacturers Association, Statler Hotel, Buffalo, N. Y., Oct. 11-13
American Road Builders Ass'n, Inc., Cleveland Auditorium .....Jan. 14-19
American Society for Steel Treating, Commercial Museum, Philadelphia .....Oct. 8-13
American Society for Testing Materials, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. .....June 25-29
Automotive Equipment Association, Grand Hotel, Mackinac Island, June 17-23
Automotive Equipment Association, Coliseum, Chicago .....Oct. 22-27
National Association of Automobile Show and Association Managers, Before-Shows, Drake Hotel, Chicago .....July 26-27
National Automobile Chamber of Commerce, Service Managers' Forum, Toronto .....June 18-19
National Safety Council, National Congress, New York .....Oct. 1-5
National Standard Parts Association, Hollenden Hotel, Cleveland, Oct. 29-Nov. 3
Society of Industrial Engineers, Rochester, N. Y. .....Oct. 17-19
World Motor Transport Congress, Rome .....Sept. 25-29

A. S. M. E.

Cincinnati, Oct. 22-25 — Machine Shop Practice.
Cleveland, Sept. 17-20—Fuels.
Detroit, June 28-29—Aeronautic Division.

S. A. E.

National

Chicago, Aeronautic Meeting .....Dec. 5-6
Detroit, Production Meeting .....Nov. 22-23
Detroit, Annual Meeting .....Jan. 15-18
Los Angeles, Aeronautic Meeting,
Los Angeles, Aeronautic Meeting, Sept. 13-14
New York, Annual Dinner, Hotel Astor .....Jan. 10
Quebec, Chateau Frontenac.....June 26-29
Transportation Meeting .....Oct. 16-18

RACES

Belgium .....Aug. 12
France .....July 1
Germany .....July 15
Great Britain .....Sept. 22
Italy .....Sept. 2
Spain .....July 29